
Gunnery Department
MLRS Division
"Standards Start Here"

Field Artillery Captain's Career Course

MLRS INTRODUCTION

Administrative Information

Senior Officer Instructor: SFC York

NCOIC Officer Instruction: SFC Joyner

SFC Hensch

Mr. David Allen

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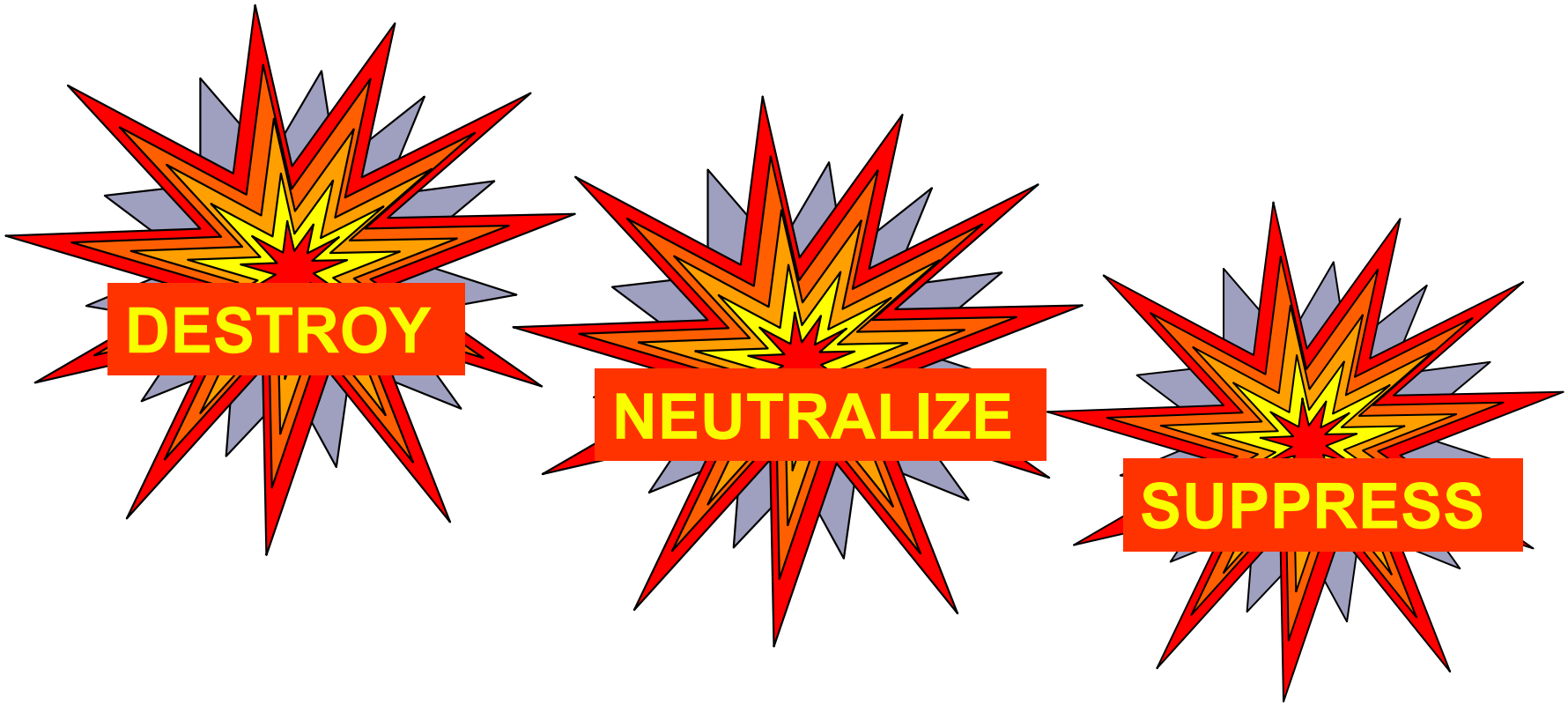
The Mission of the Field Artillery is to ...



the enemy by cannon, ROCKET and MISSILE fire and to help integrate all fire support assets into combined arms operations.

MLRS Introduction
“Steel Rain on the Battlefield”

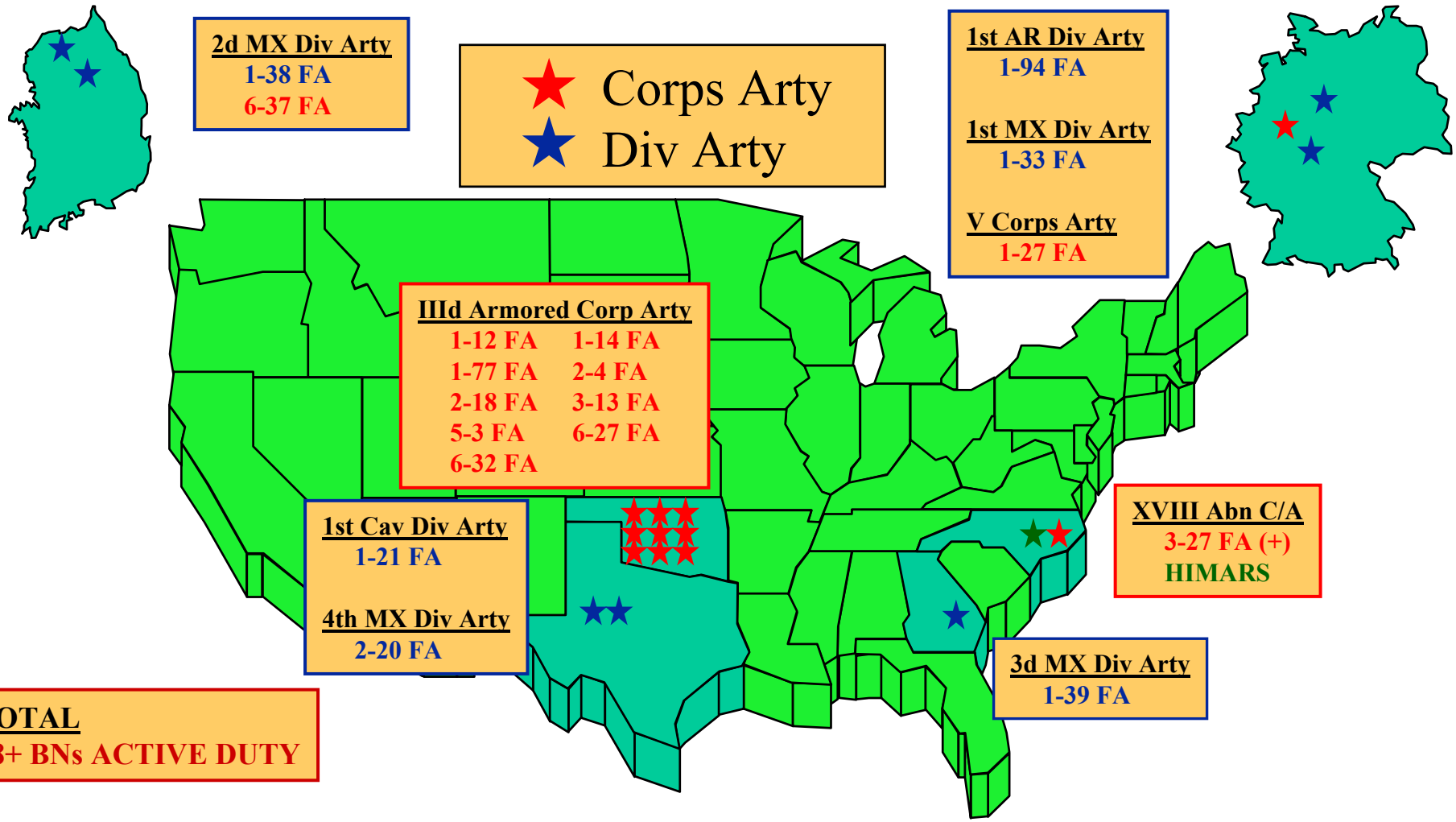
MLRS_V_09.MPG

Learning Activities

- **Identify the Organization of MLRS Battalions**
- **Acquire knowledge of MLRS Weapon System Components**
- **Identify MLRS Family of Munitions**
- **Identify ATACMS Family of Munitions**
- **Identify the Capabilities and Limitations of MLRS**
- **Identify Special Tactics of MLRS**

MLRS Battalion Organization

Active Component

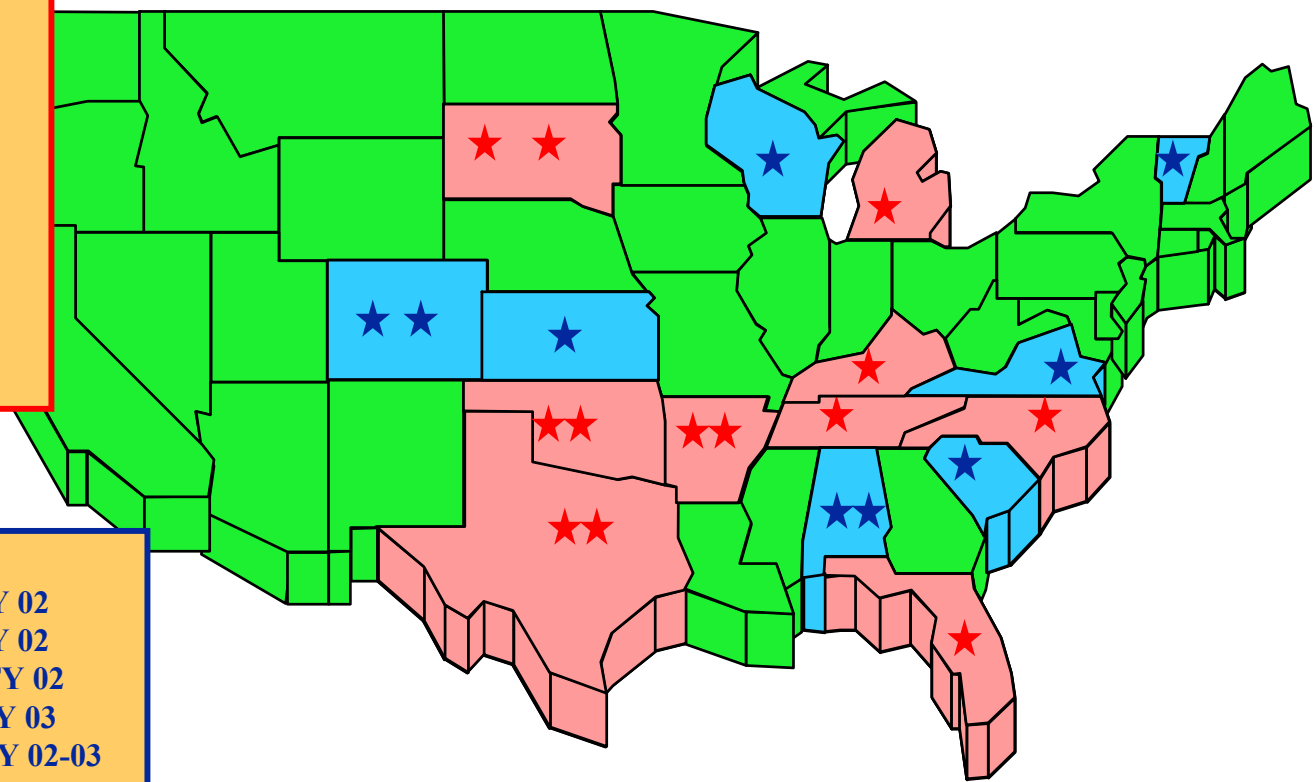


National Guard Component

FIELDED ARNG

1-158 FA	OKLAHOMA
B/2-131 FA	TEXAS
1-171 FA	OKLAHOMA
1-182 FA	MICHIGAN
1-181 FA	TENNESSEE
1-623 FA	KENTUCKY
3-116 FA	FLORIDA
2-130 FA	KANSAS
3-178 FA	S. CAROLINA
1-142 FA	ARKANSAS
1-147 FA	S. DAKOTA
2-147 FA	S. DAKOTA
5-113 FA	N. CAROLINA
2-142 FA	ARKANSAS
C/2-131 FA	TEXAS

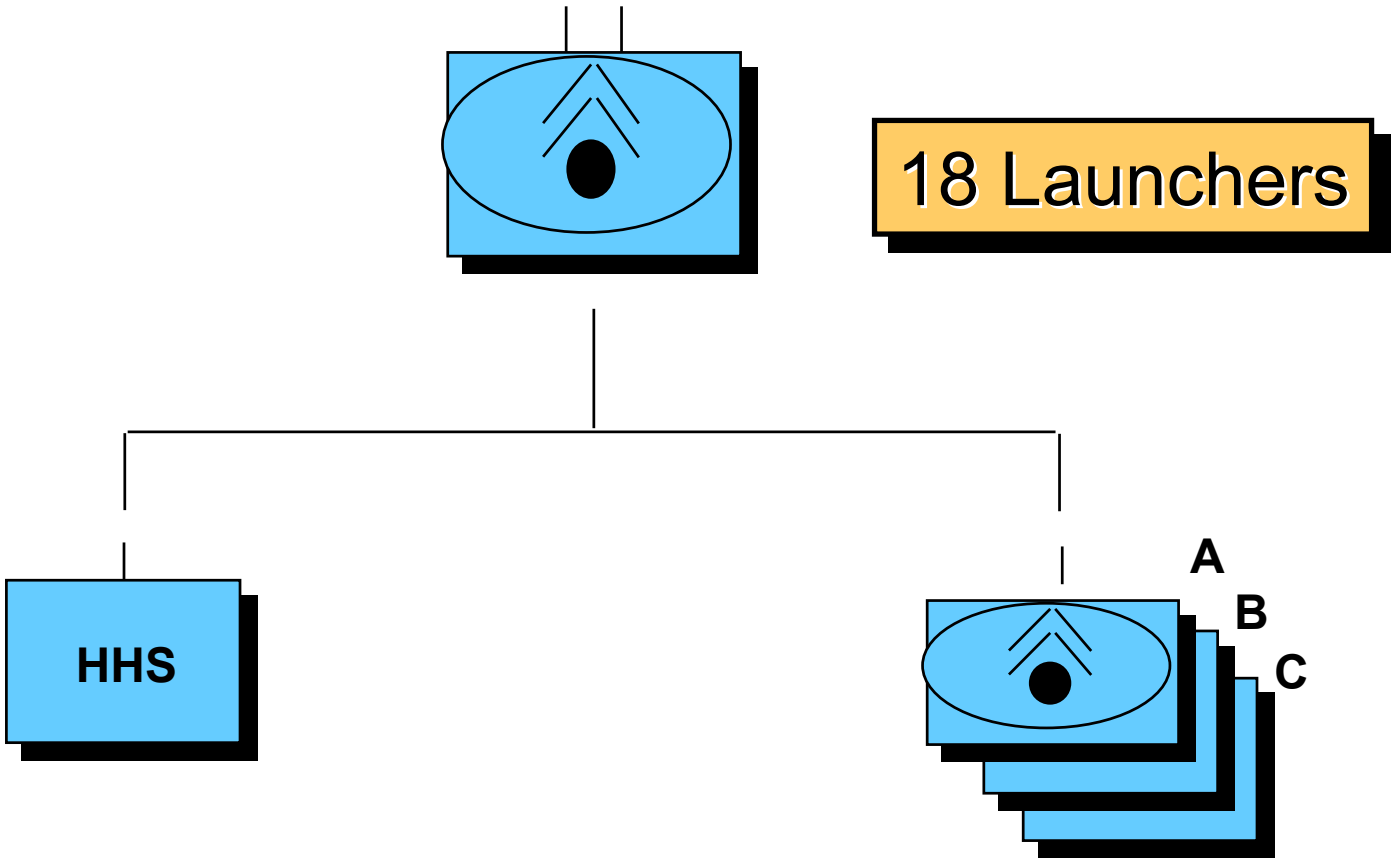
TOTAL
18+ BNs ACTIVE DUTY
21+ BNs NATIONAL GUARD



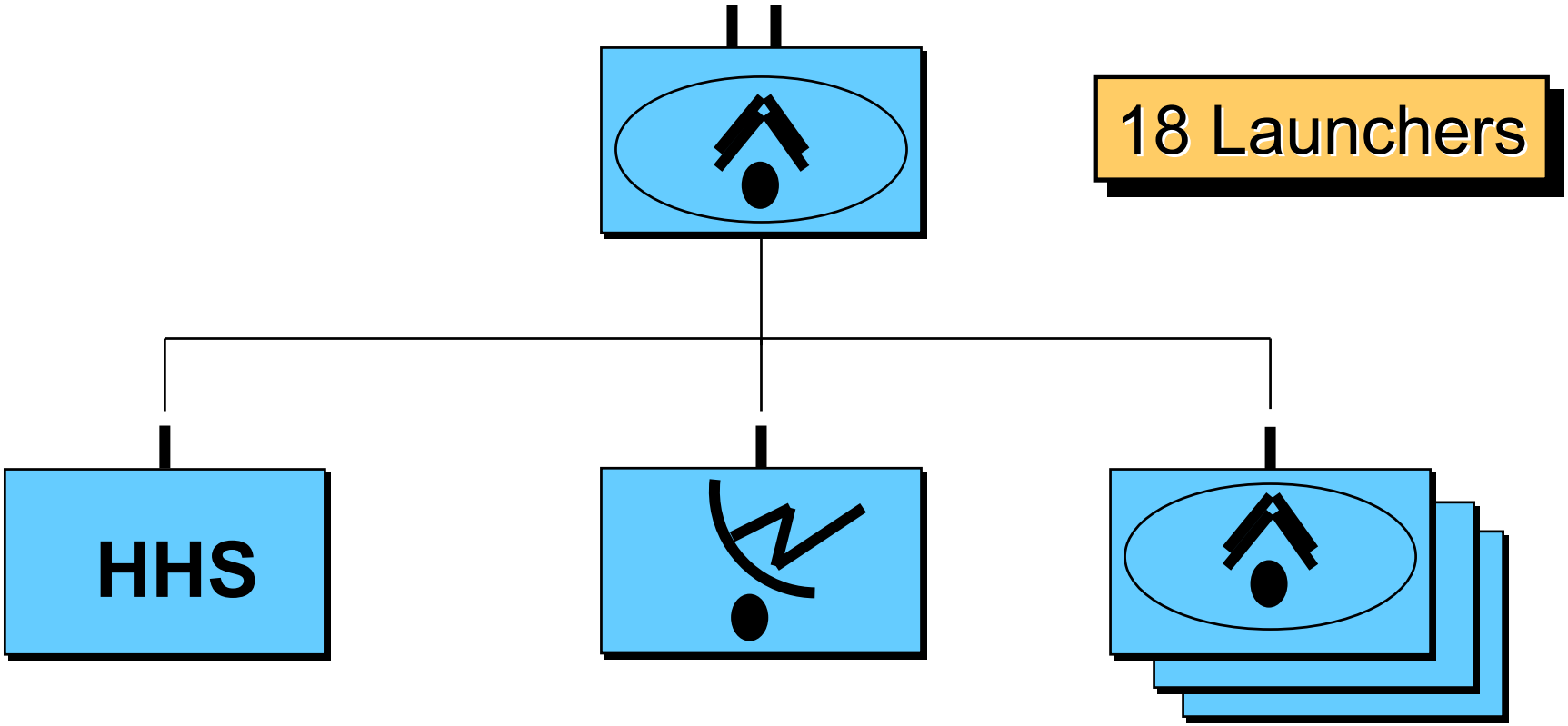
PROPOSED ARNG

3-117 FA	ALABAMA	FY 02
2-117 FA	ALABAMA	FY 02
2-157 FA	COLORADO	FY 02
1-157 FA	COLORADO	FY 03
1-86 FA	VERMONT	FY 02-03
1-161 FA	KANSAS	FY 03-04
1-111 FA	VIRGINIA	FY 03-04

Corps MLRS Battalion



Divisional MLRS Battalion



One Firing Battery Augmented from National Guard

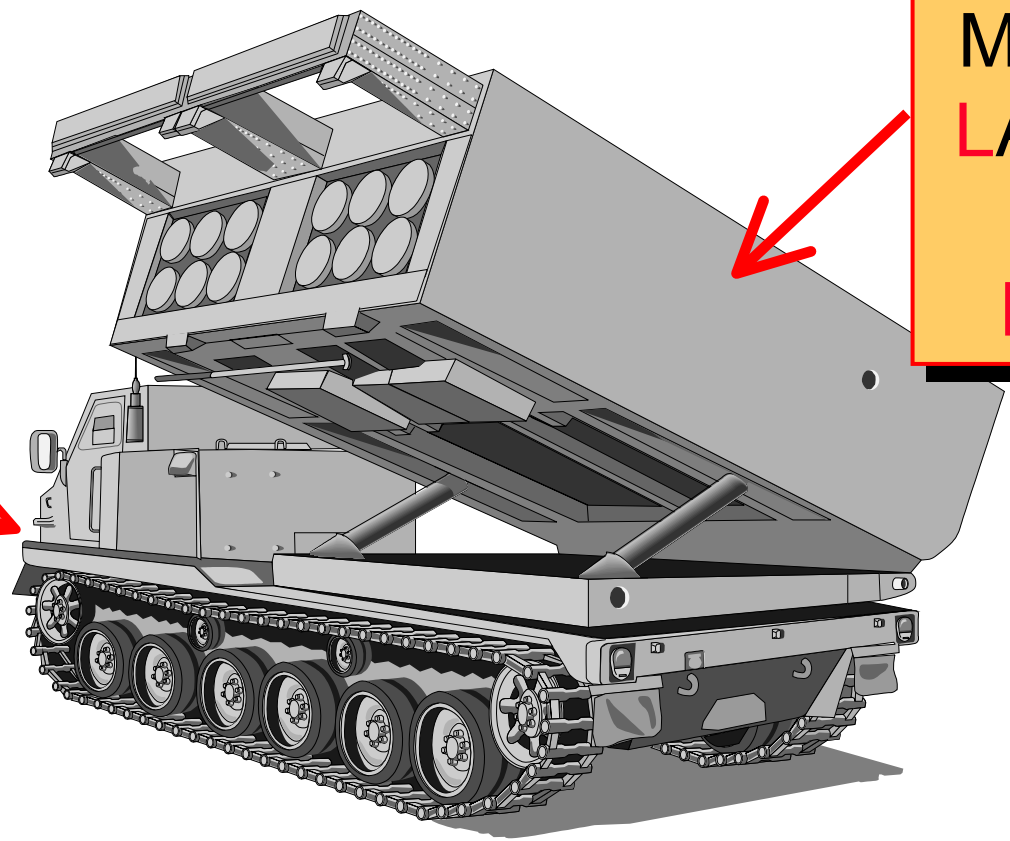
Weapon System Components

Weapon System Components

- Self Propelled Launcher Loader
- Launch Pod Containers
- Guided Missile Launch Assembly
- Heavy Expanded Mobility Tactical Truck
- Heavy Expanded Mobility Ammunition Trailer
- C^3 Systems

M270 Self-Propelled Launcher Loader (SPLL)

M993 Carrier Vehicle



M269 (LLM) LAUNCHER LOADER MODULE

Fire Control System (M270)

- Fire Control Panel (FCP)
- Electronics Unit (EU)
- Fire Control Unit (FCU)
- Boom Controller (BC)
- Short/No-Voltage Tester (SNVT)
- Stabilization Reference Package/Position Determining System (SRP/PDS)
- Payload Interface Module (PIM)
- Communications Processor (CMP)

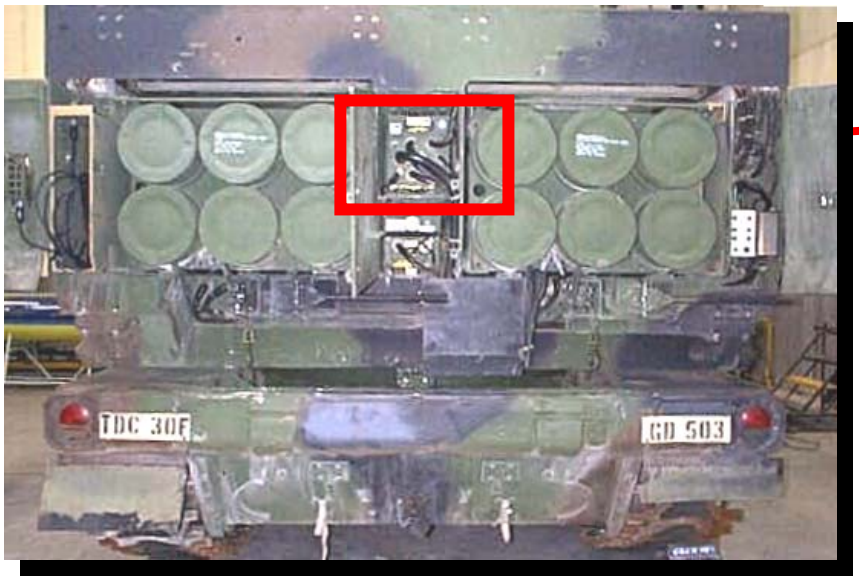
Fire Control Panel (FCP) (M270)

- Located in center of Carrier Cab
- Command and Control Center for Launcher Chief
- Contains Built in Test indicator lamps (BIT) for LRU

Electronics Unit (EU) (M270)

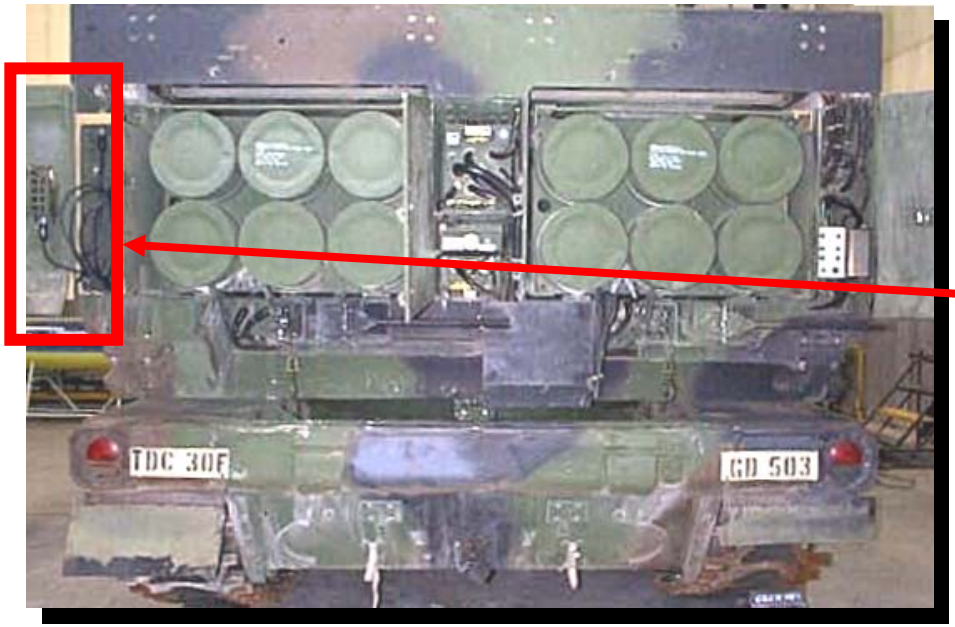
- Located behind engine compartment
- Contains computer program and data processing electronics
- Holds all current weapon files and operational data

Fire Control Unit (FCU) (M270)



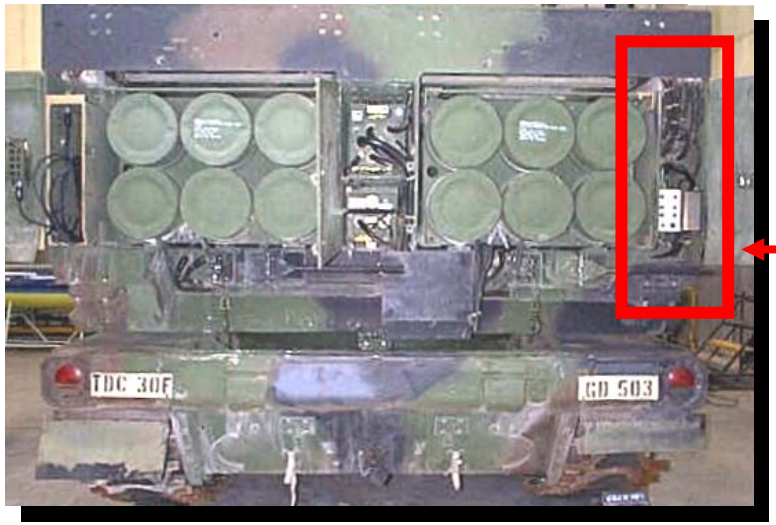
- Located at the rear of launcher in the center storage compartment
- Contains the electronic circuits that change EU output into control signals
- Receives inputs from other components for EU to use

Boom Controller (BC) (M270)



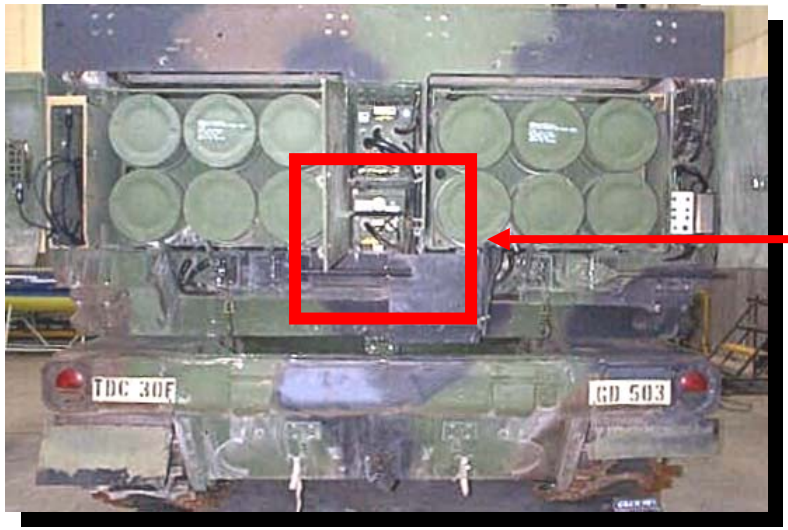
- Located at the left rear of launcher
- Permits remote control of the LLM during Reload Operations and for Maintenance
- Nine meter cable to allow remote control

Short/No-Voltage Tester (SNVT) (M270)



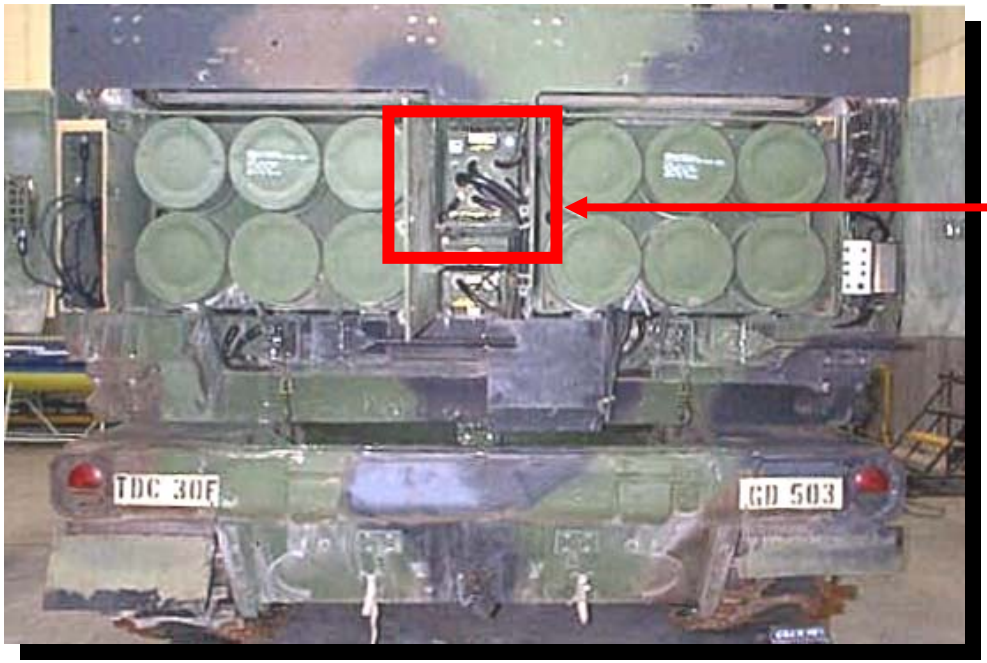
- Located at the right rear of launcher
- Built in test device used during loading operations
- Tests the W19 cables for stray voltage or static electricity
- Test conducted prior to connecting cables to LPC/GMLA
- Only takes 1vlt and 1 amp to ignite rocket

Stabilization Reference Package/Positioning Determining System (SRP/PDS) (M270)



- Located at the rear of launcher in center storage compartment, bottom shelf
- SRP consists of electrically driven, north seeking gyrocompass. Provides heading, elevation, slope for launcher
- PDS determines position location by use of encoders located on launcher final drives

Payload Interface Module (PIM) (M270)



- Located at rear of launcher in center storage compartment, behind FCU
- Provides communication power and interface between the launch pods and the EU

Communications Processor (CMP) (M270)

- Located behind the Gunner in carrier cab, above radios
- Controls the flow of digital coded audio tone sent and received by the launcher communications-FCS interface

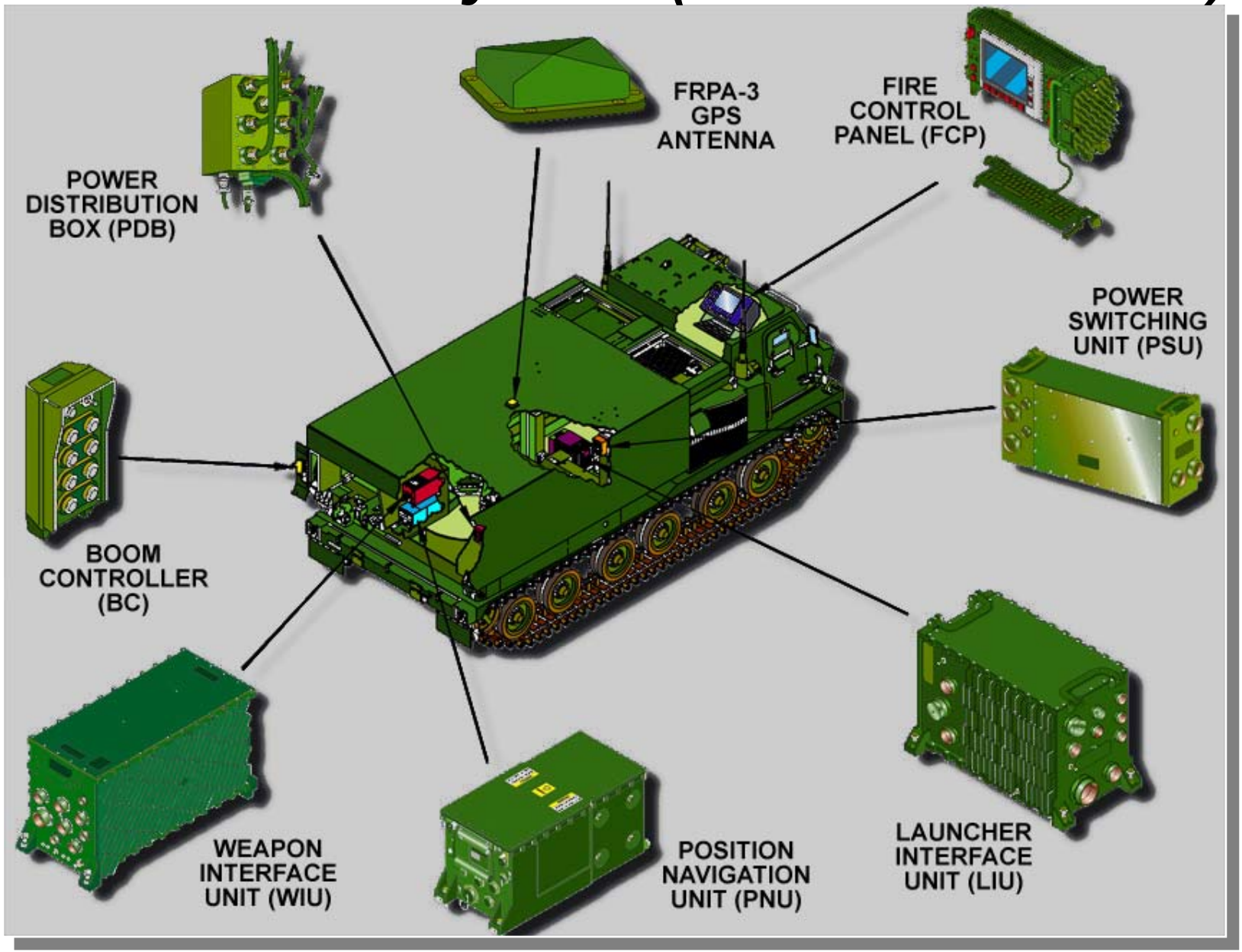
Program Load Unit (PLU)

- Located with Platoon Leader/Platoon Sergeant
- Electronic device used to program the EU Memory
- Mounts a cassette containing operational program data

Fire Control System (M270A1/HIMARS)

- Fire Control Panel (FCP)
- Power Switching Unit (PSU)
- Launcher Interface Unit (LIU)
- Position Navigation Unit (PNU)
- Weapon Interface Unit (WIU)
- Boom Controller (BC)
- Power Distribution Box (PDB)
- GPS Antenna

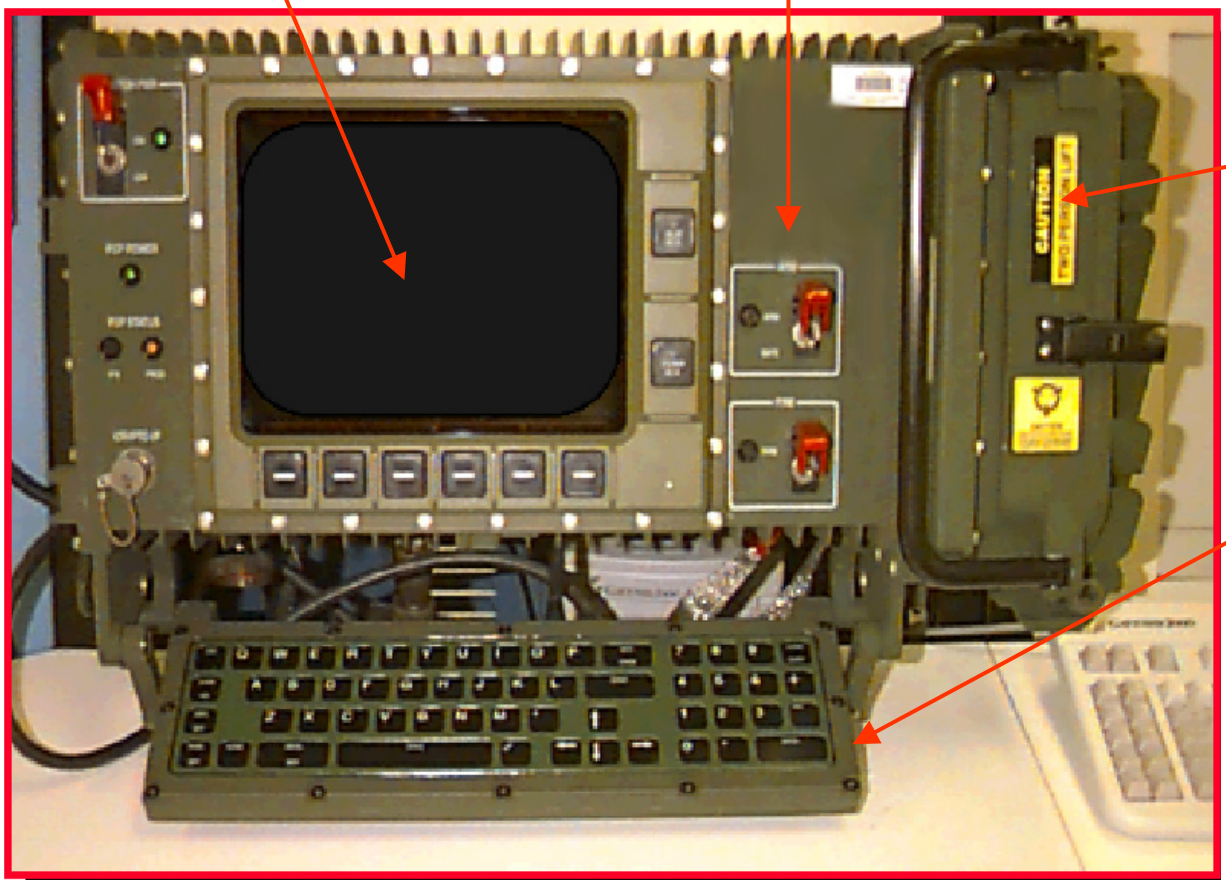
Fire Control System (M270A1/HIMARS)



Fire Control Panel

Display Assembly

Main Chassis



Mass Storage Device (MSD)

- Provides non-volatile storage for the system software and database information
- 350 megabytes

Keyboard

Weighs approx. 63lbs (28.6kg)

Launcher Interface Unit

•

- Oversees FCS operations:
  - controls and monitors system power
  - controls internal and external communications
- Monitors and controls:
  - hydraulic fluid level, temperature, and pressure
- status of safety switches on:
  - Jury struts
  - LPC lockdown down latches

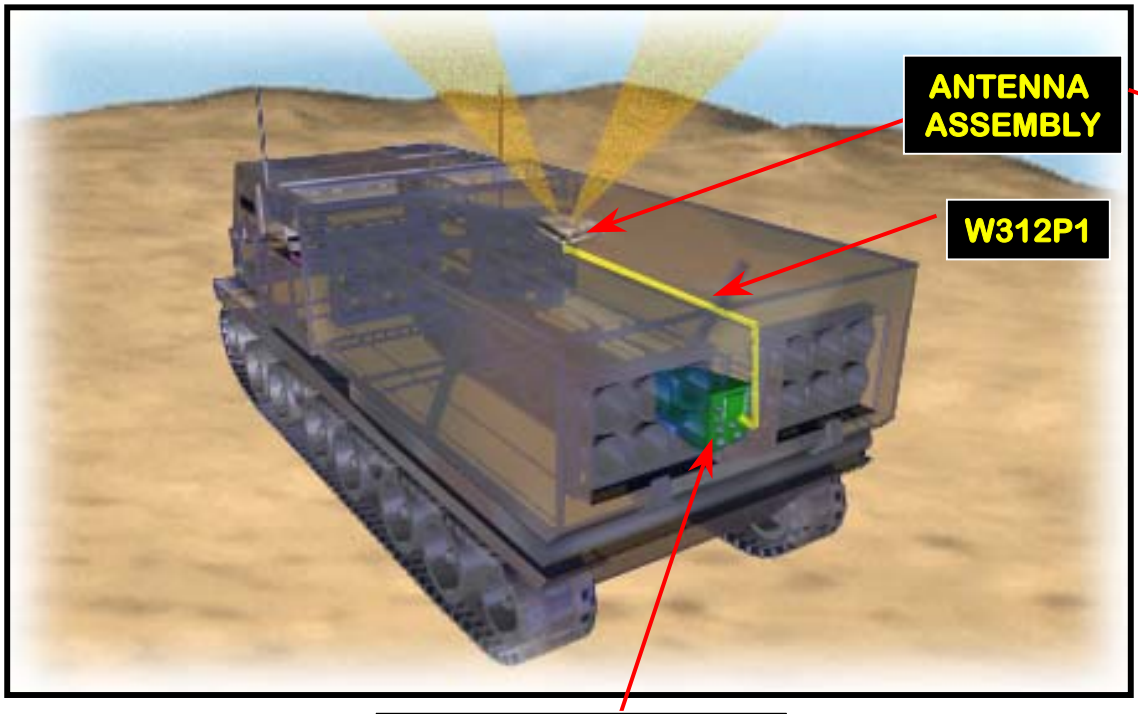
Weighs approx. 60 lbs (27 kg.)

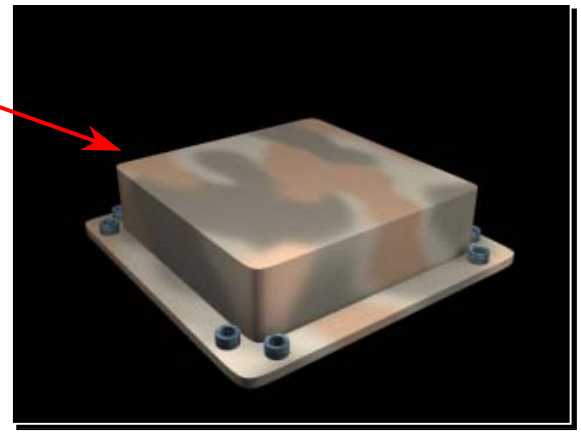
Power Switching Unit

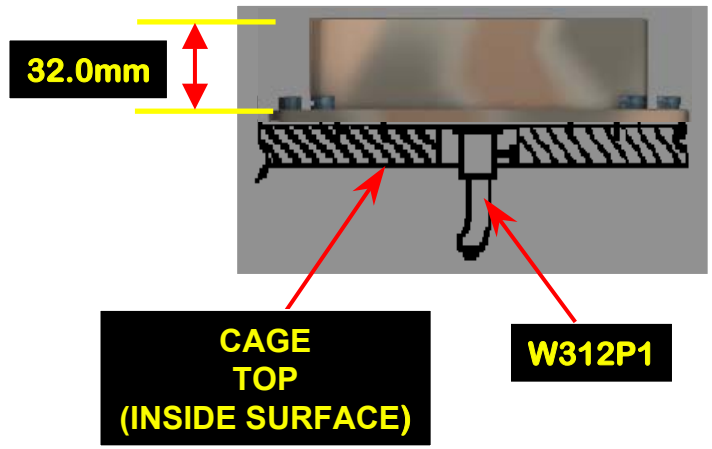
- Replaces Electronics Box
- Controlled by the LIU
- Provides electrical interface
- between the launcher power
- sources and the electronic
- components

Weighs approx.
46 lbs (20.8 kg)

GPS Antenna







- provides the signal interface between the GPS satellite constellation and GPS receiver embedded in the PNU
- 4 or 5 satellites, with crypto signal, provides position accuracy within 10 meters

Position Navigation Unit

- Replaces Stabilization Reference Package/Position Determining System (SRP/PDS)
- Operates with GPS Aiding or Non-Aided using Inertial System

Consists of:
- three RL-34 ring laser gyros
- three Q-Flex accelerometers
- no moving parts

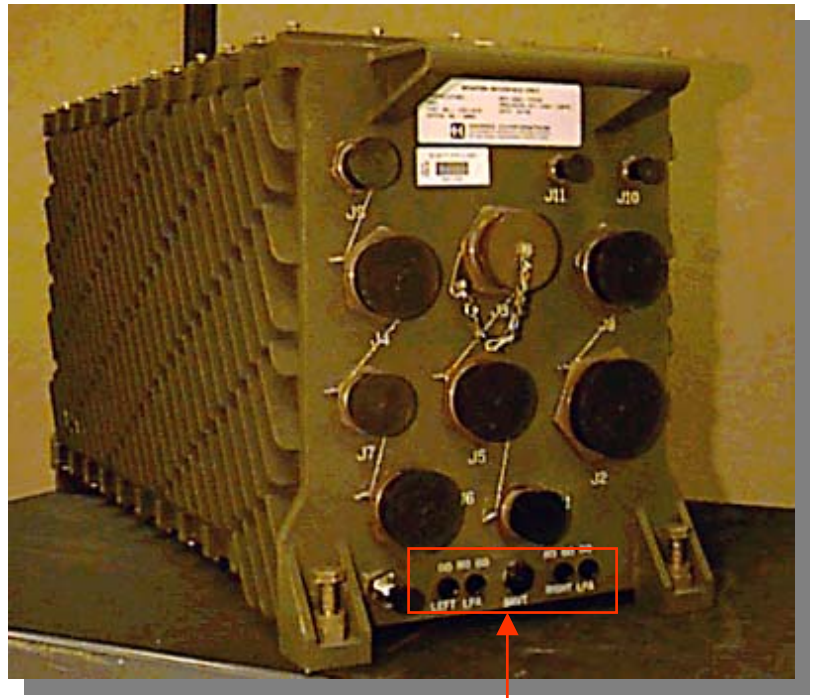
*NO PDS CALIBRATION REQUIRED

Alignment times:
- stationary = 2 to 5 minutes
- on the move = 15 minutes
- *GPS must be available to align on the move

Weighs approx. 67 lbs (30.5 kg)

Weapon Interface Unit

- Replaces:
- Payload Interface Module (PIM)
- Short No Voltage Tester (SNVT)
- Performs some Fire Control Unit (FCU)functions
- Controls electrical interface with weapons and performs ballistic computations

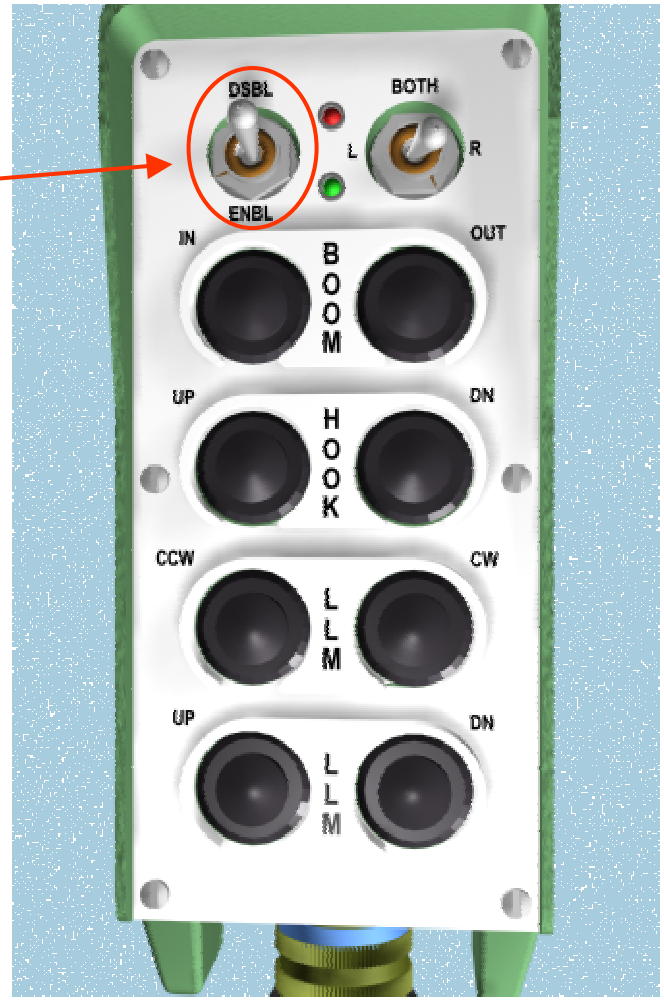


SNVT

Weighs approx.
67 lbs (30.4 kg)

Boom Controller

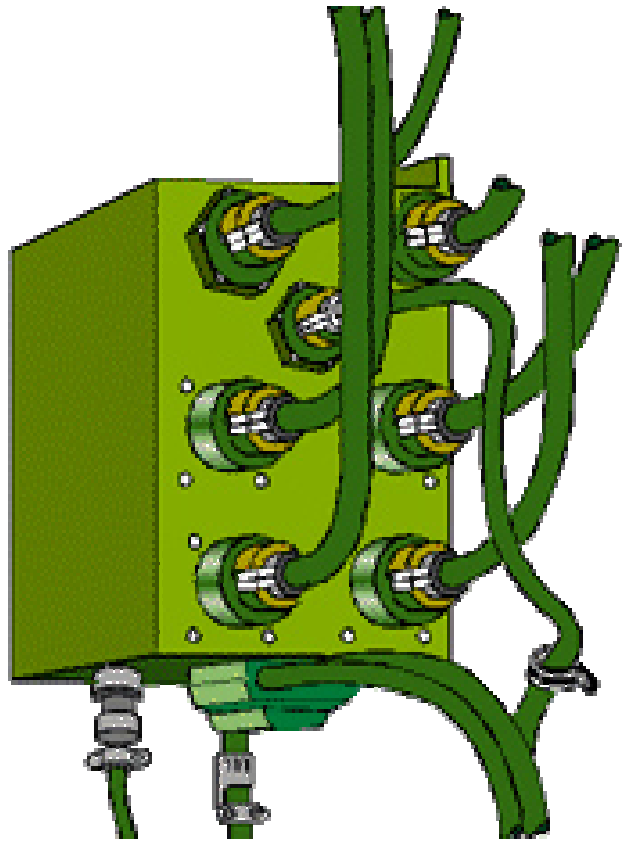
- LDS Disable/Enable Safety Switch
- used to stop uncommanded LM movement only
- turns off LDS and stops LM motion
- whenever uncommanded LM motion is detected
- the FCS must be re-booted prior to continuing operations



USED ONLY FOR EMERGENCIES

Power Distribution Box

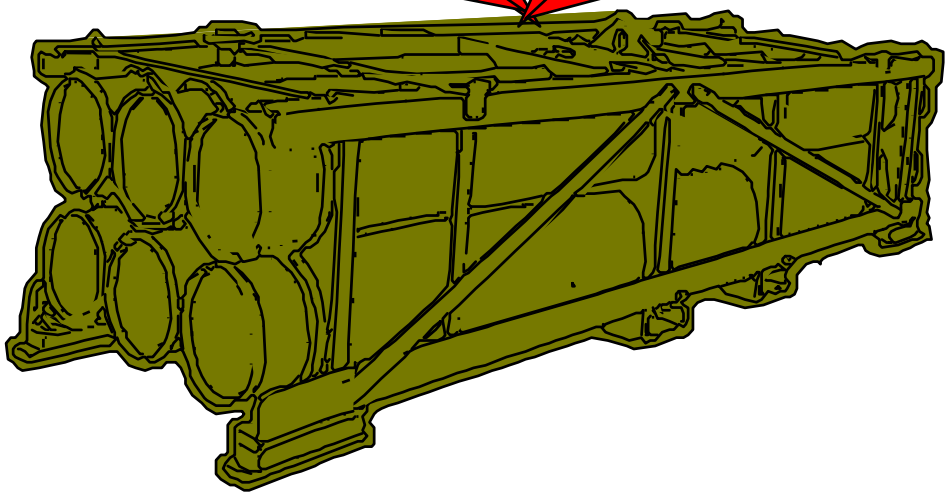
- Provides an operational interface to the:
  - boom/hoist assemblies
  - travel lock actuator
  - cage down limit switch
- Weighs approx. 14 lbs. (6.3 kg)



LPC / GMLA

LPC
Launch POD Container
6 Rockets/LPC

GMLA
Guided Missile
Launch Assembly
1 Missile/GMLA



Launch Pods (LPC/GMLA)

- Common electrical connectors
- Handling, transport and loading fixtures similar
- Visually similar in excess of 100 meters
- Different center of gravity

Launcher Firing Capability

ROCKETS

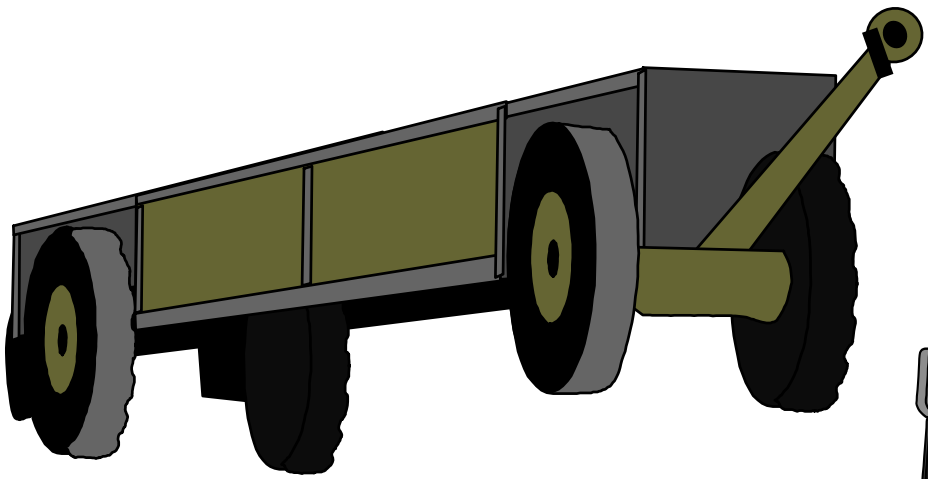
- Fire 12 rockets in
- 60 seconds.
- Interval between 5 and 99 seconds.
- Aimed at single or multiple aimpoints.

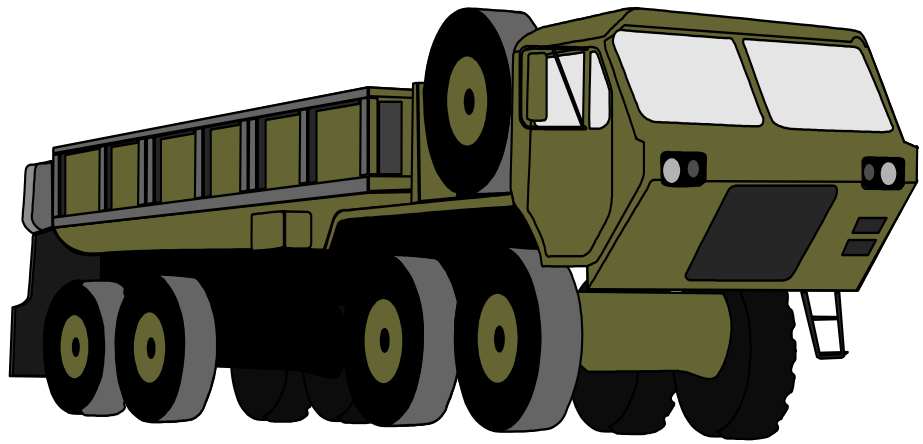
MISSILES

- Fire 2 missiles in 20 seconds.
- Interval between 5 and 99 seconds.
- Aimed at 1 or 2 separate aimpoints.

HEMTT / HEMAT

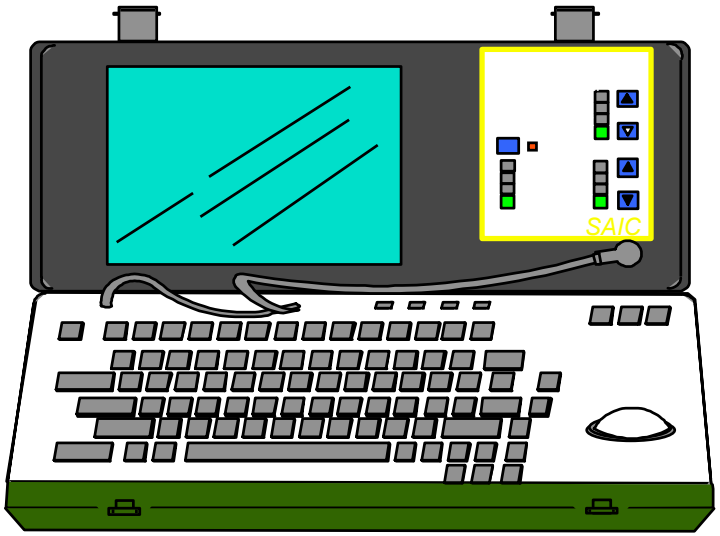
- M985 Heavy Expanded Mobility Tactical Truck
- M989A1 Heavy Expanded Mobility Ammunition Trailer





Fire Direction System (FDS)

Provides tactical fire direction and C^3at:



AN/GYK-37

II

TOC

<u>BATTALION</u>

C^2 information

Select platoon to fire

I

BOC

<u>BATTERY</u>

C^2 information

Select launcher to fire

Perform as BN

●●●

POC

<u>PLATOON</u>

Monitor C^2 information

Relay fire mission data

Detachment C^2

Perform as BTRY

FDS C ^{3} Capabilities

Advanced FA Tactical Data Sys. (AFATDS)

Firefinder Radar (Q36) & (Q37)

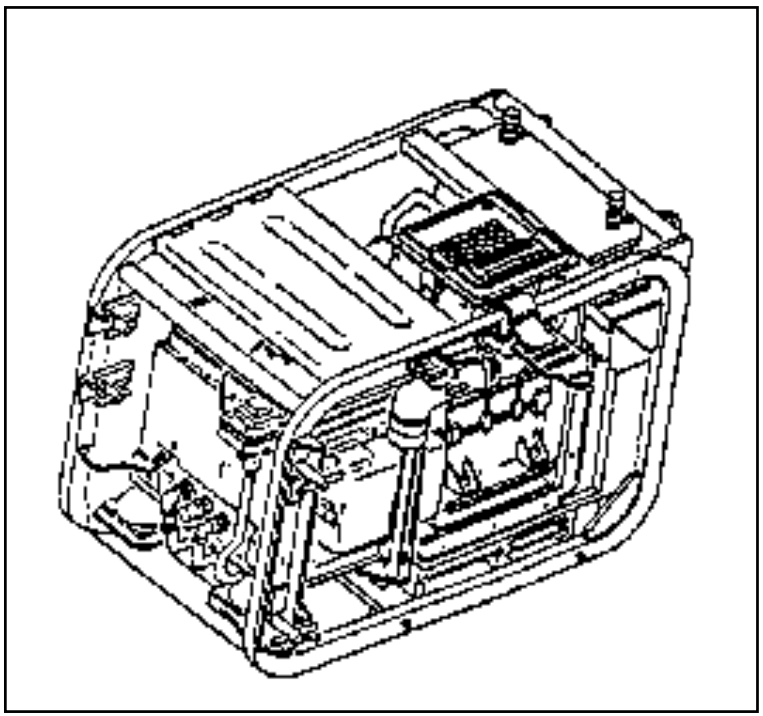
All Source Analysis System(ASAS)

Airborne Target Hand over System (ATHS)

Marine Corps Fire Support System (MCFSS)

Ground Station Module (GSM)

Position Azimuth Determining System (PADS)



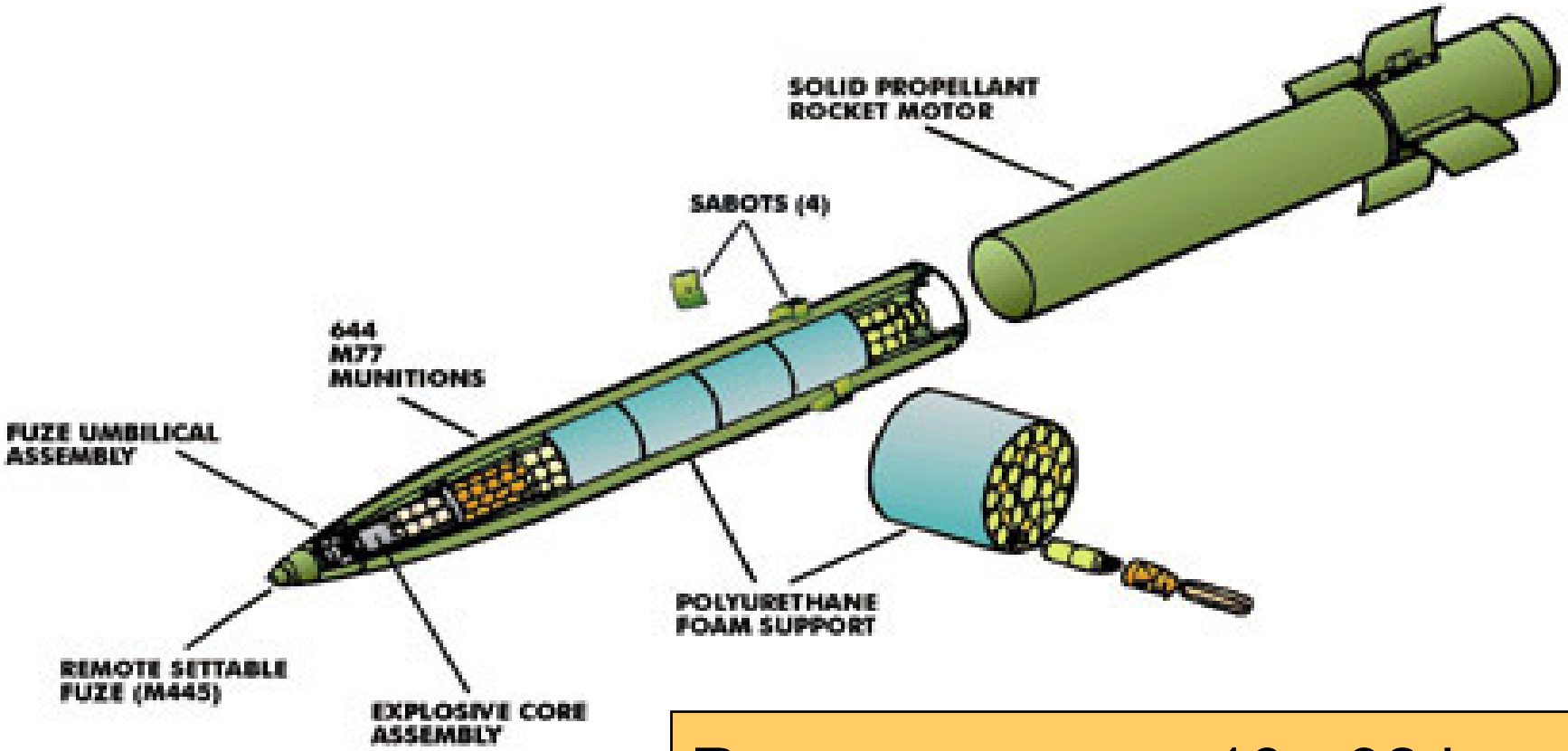
- 3 PADS per Battalion.
- Determines location, azimuth and altitude.
- Primary means for determining position control.

Precision Lightweight GPS Receiver (PLGR)

- One PLGR per launcher section.
- Secondary means for establishing position control.
- Only useful for position control when it provides a figure of merit (FOM) of 1.

MLRS FAMILY OF MUNITIONS (MFOM)

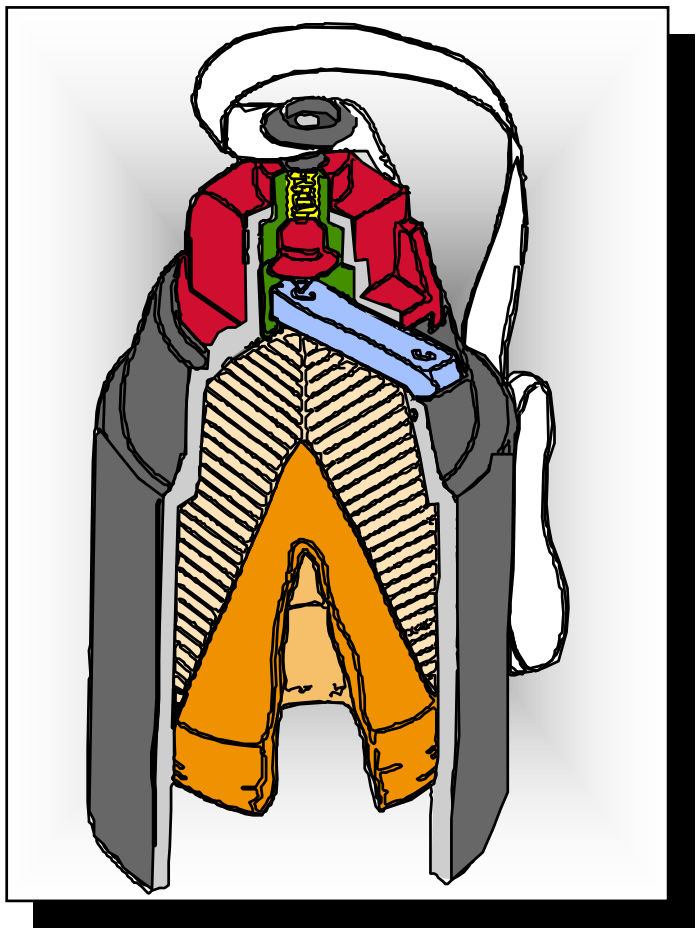
M26 Rocket



Tube launched,
spin stabilized,
free-flight rocket

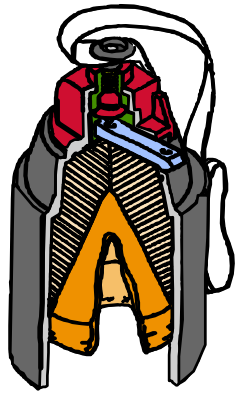
Range:	10 - 32 km
Submunitions:	644
Accuracy:	10 mils

M77 DPICM Submunition



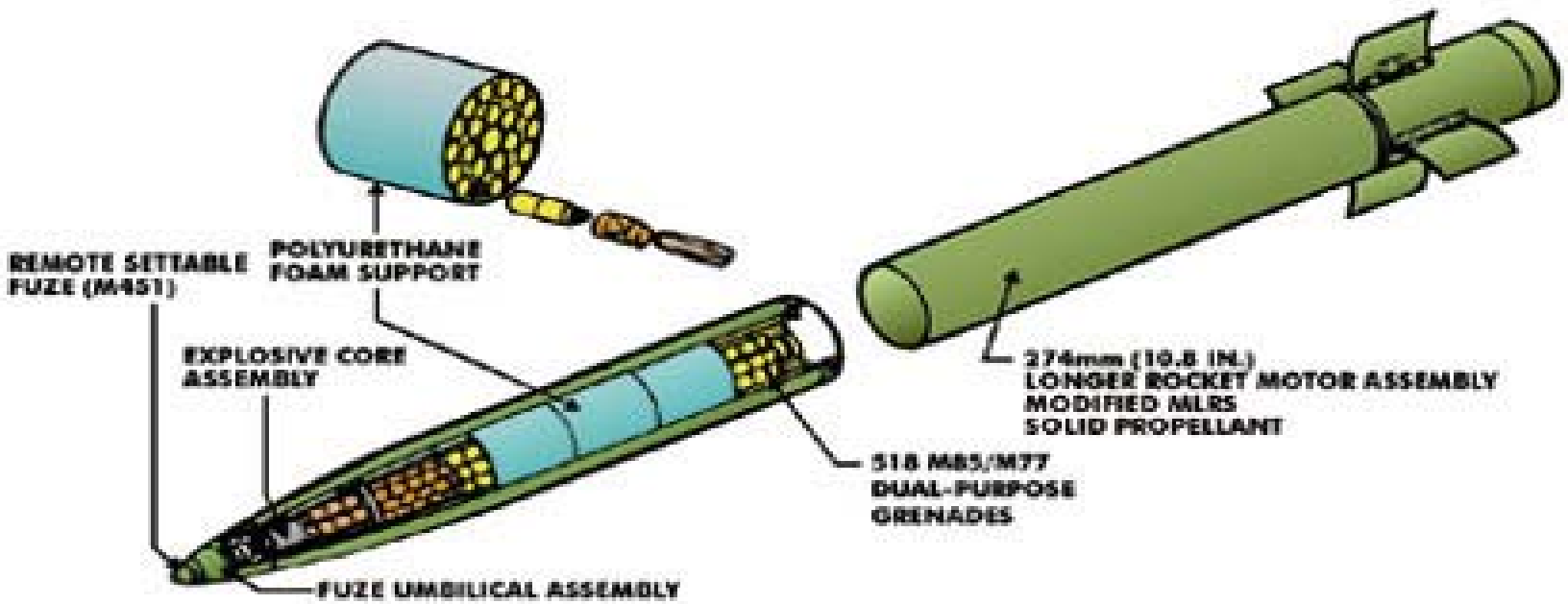
- Point detonating shaped charge.
- Penetrates up to 4 inches of armor.
- Fragmentation radius of 4 meters.
- Effective against soft and lightly armored targets.

M77 Dual Purpose Improved Conventional Munition (DPICM)



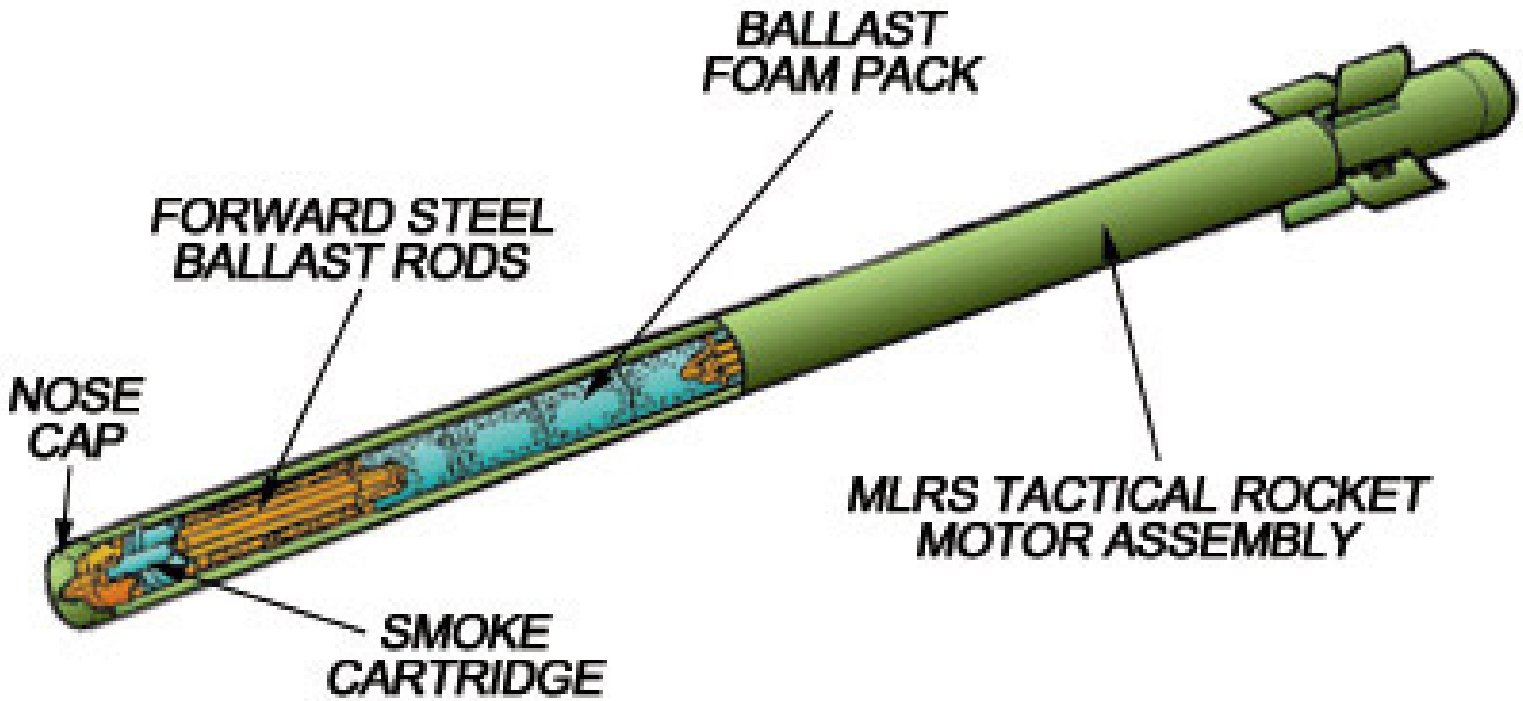
	Rockets (M26)	Submunitons
1 Rocket	1 Rocket	644
1 Launcher	12 Rockets	7,728
1 Platoon	36 Rockets	23,184
1 Battery	72 Rockets	46,368

M26A2 Extended Range Rocket



518 M77 Submunitions, max. range 45 km, improved dud rate.

M28A1 Reduced Range Practice Rocket



Tube launched,
spin stabilized,
free-flight rocket

Range:	8 - 15 km
Submunitions:	None
Accuracy:	10 mils

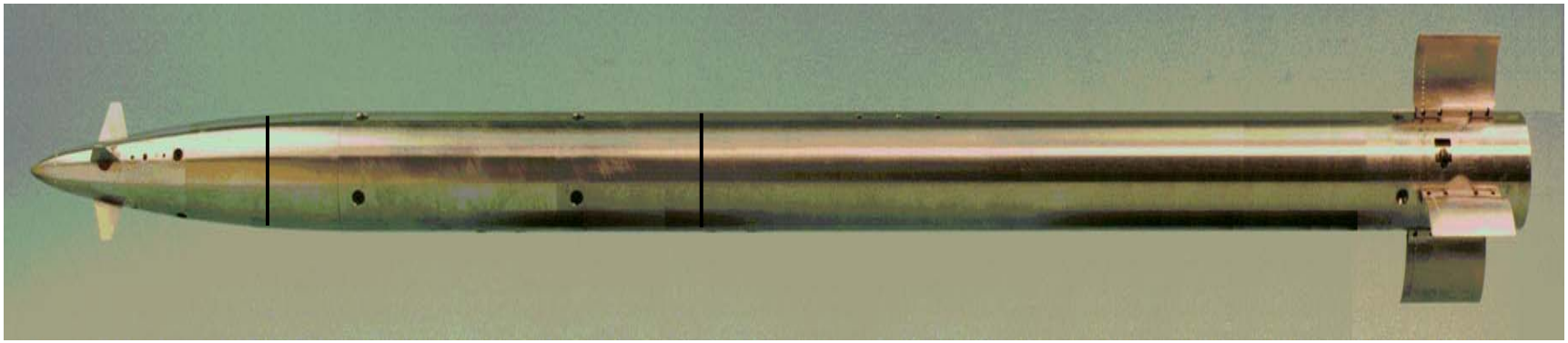
MLRS (M26) vs 155mm Firepower Comparison

MLRS (3x6)	Cannon (3x6)		
1 ROCKET	BTRY	1(+) or	8 RDS
1 LAUNCHER	BN	4(+) or	88 RDS
1 PLATOON	BN	14(+) or	264 RDS
1 BATTERY	BN	29(+) or	527 RDS

M26 vs M483A1 Ammunition Comparison

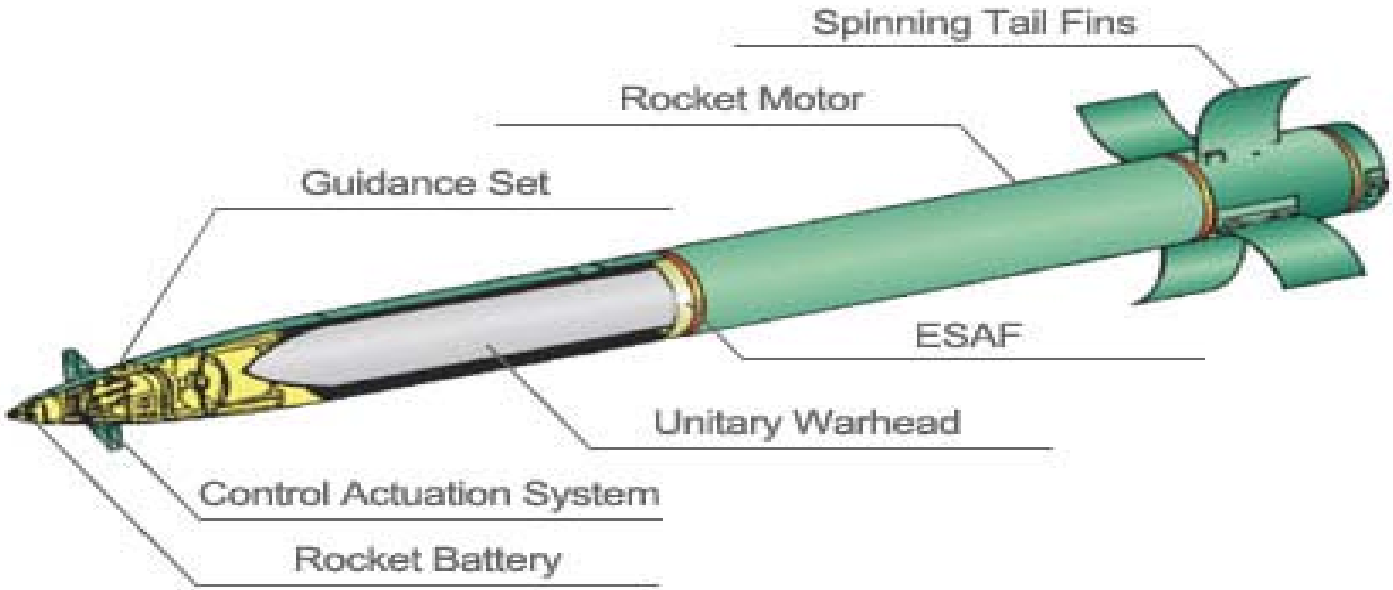
	M26 Rocket	M483A1
Min. Range	10 km	500 m
Max. Range	32 km	17.5 km
Submunitions	644 (M77)	88 (M42&M46)
Accuracy	10 mils	3 mils

Guided MLRS Rocket (GMLRS) XM30



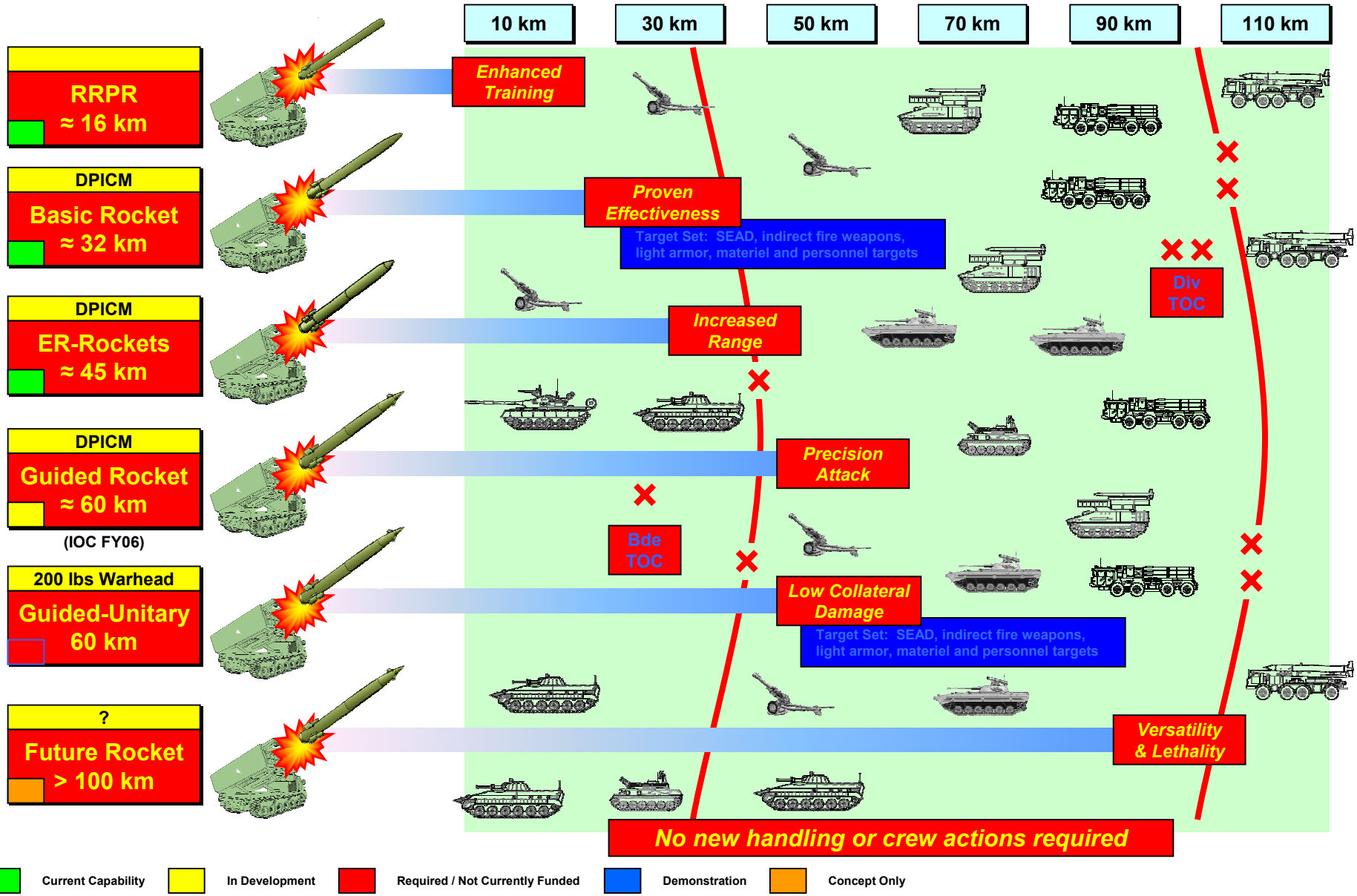
- Adds GPS guidance system and increases max. range to approx. 60km. For use with IPDS/A1/HIMARS launchers.
- 2-3 mil error across entire range.

Guided Unitary Rocket



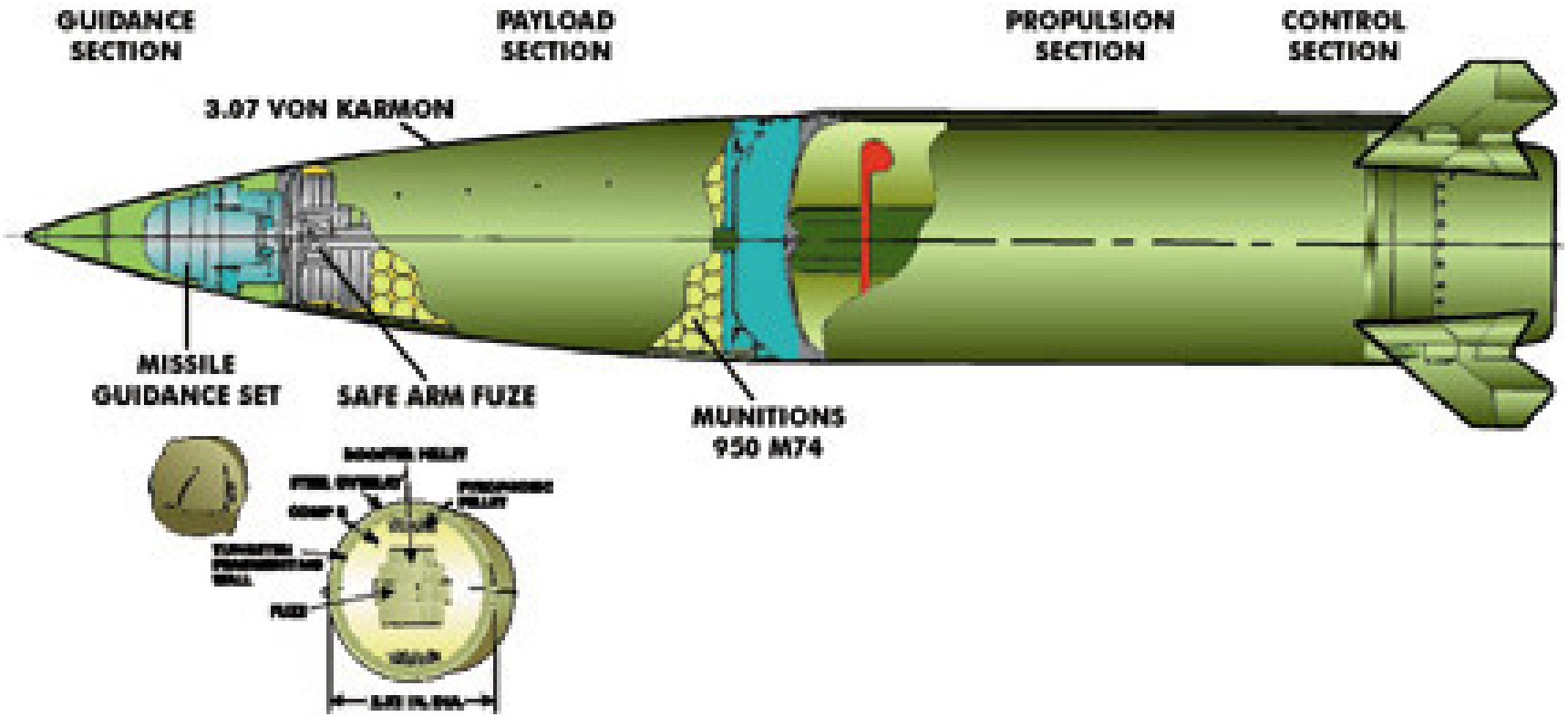
- Integrates approximately 200 pound Unitary Warhead into the GMLRS
- Low cost/risk program to greatly reduce collateral damage
- One round, one kill capability

MFOM Review


10 km
30 km
50 km
70 km
90 km
110 km
RRPR
≈ 16 km
Enhanced Training
DPICM
Basic Rocket
≈ 32 km
Proven Effectiveness
Target Set: SEAD, indirect fire weapons, light armor, materiel and personnel targets
DPICM
ER-Rockets
≈ 45 km
Increased Range
Div TOC
DPICM
Guided Rocket
≈ 60 km
(IOC FY06)
Precision Attack
Bde TOC
200 lbs Warhead
Guided-Unitary
60 km
Low Collateral Damage
Target Set: SEAD, indirect fire weapons, light armor, materiel and personnel targets
?
Future Rocket
> 100 km
Versatility & Lethality
No new handling or crew actions required
Current Capability
In Development
Required / Not Currently Funded
Demonstration
Concept Only

ATACMS FAMILY OF MUNITIONS (AFOM)

ATACMS Block I

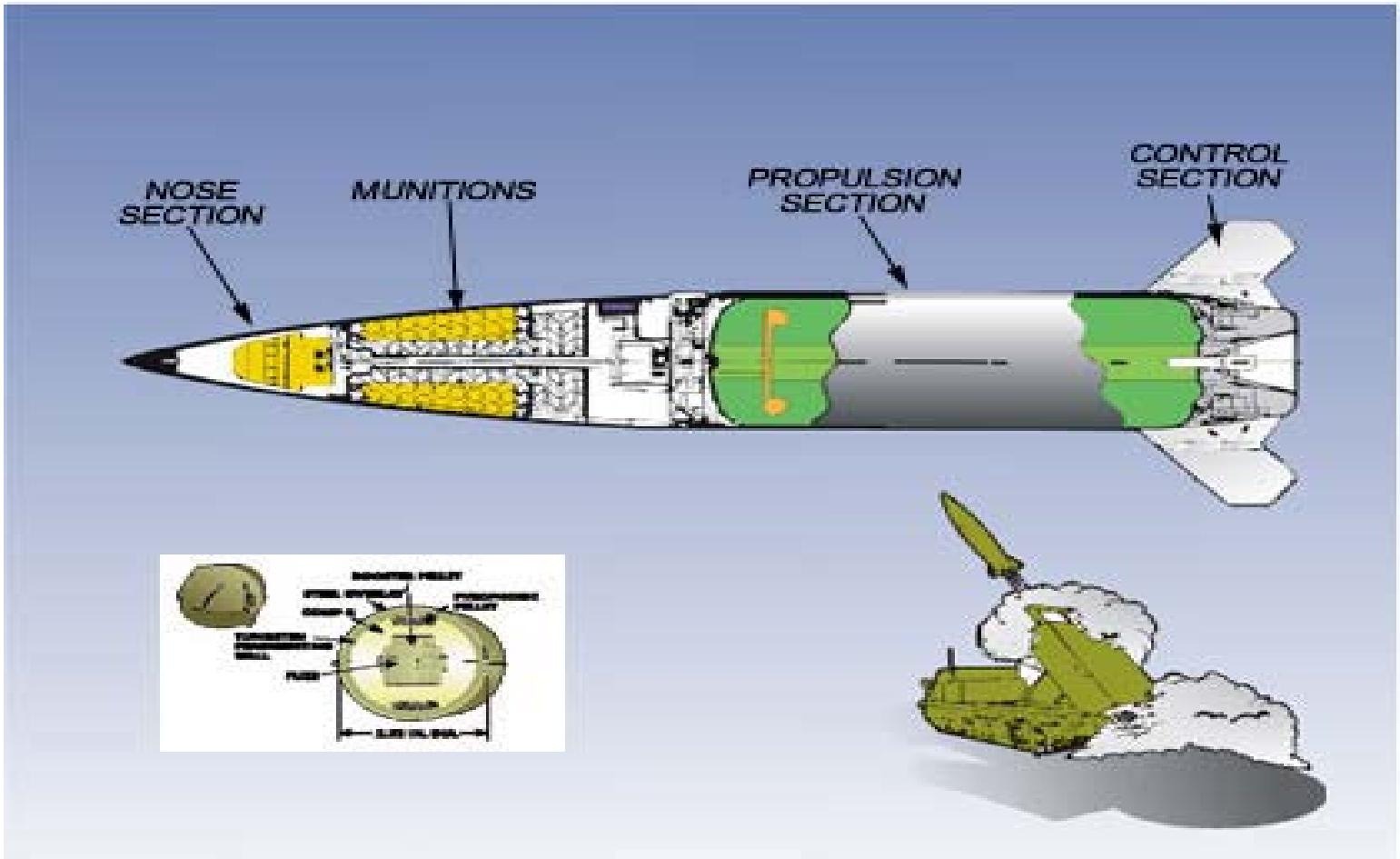


Range: 25-165 km

Submunitions: 950

Tube launched, fin stabilized, inertially guided missile.

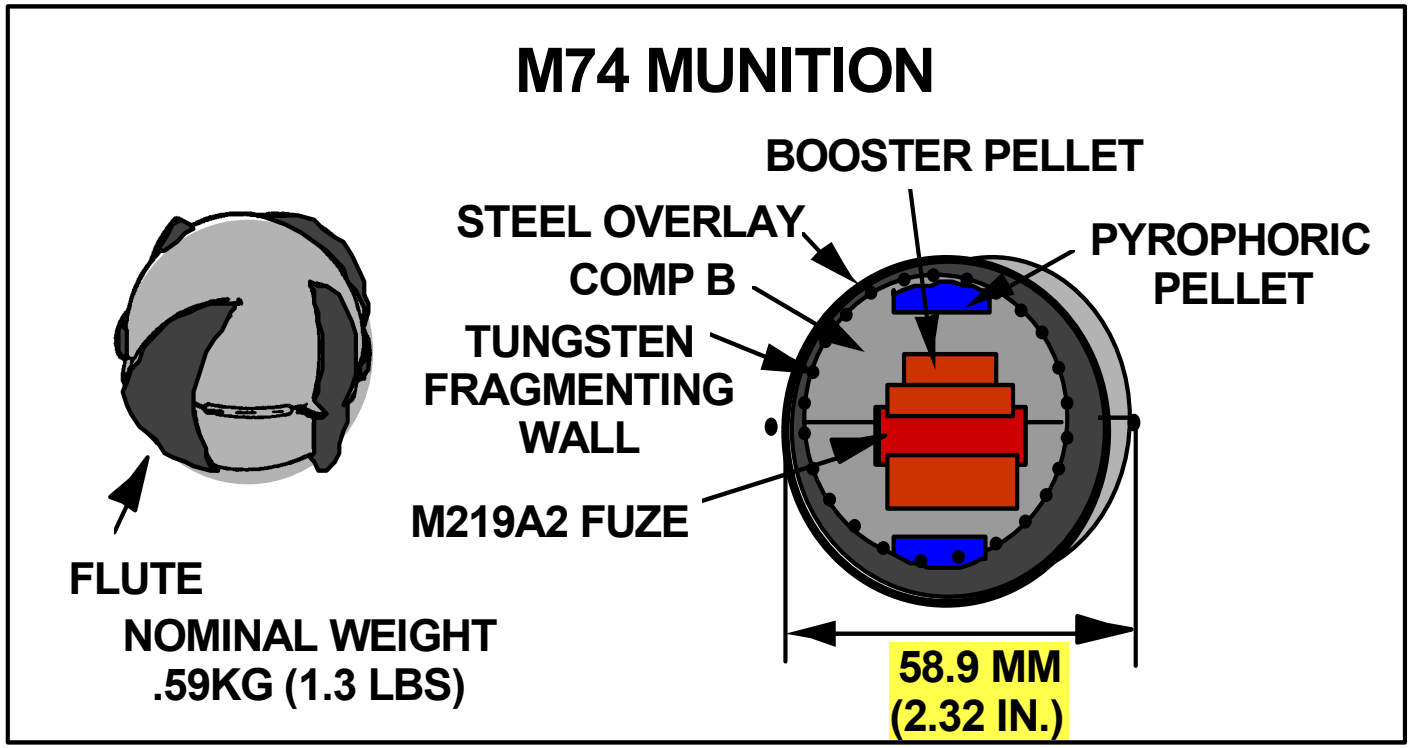
ATACMS Block IA



Range: 70-300km

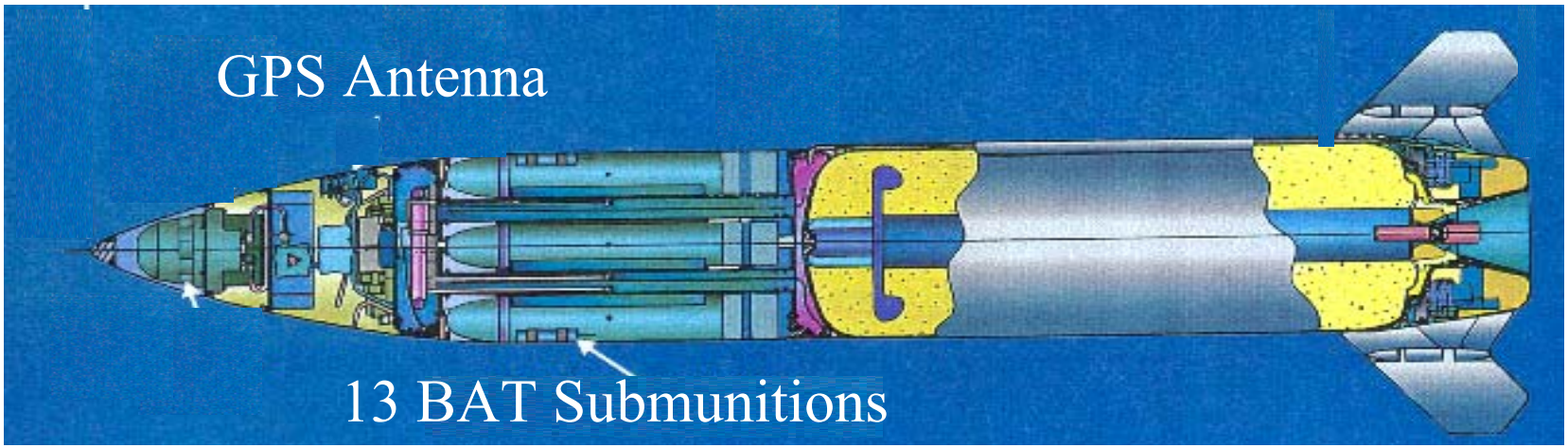
Submunitions: 300

Tube launched, fin stabilized, GPS guided missile.



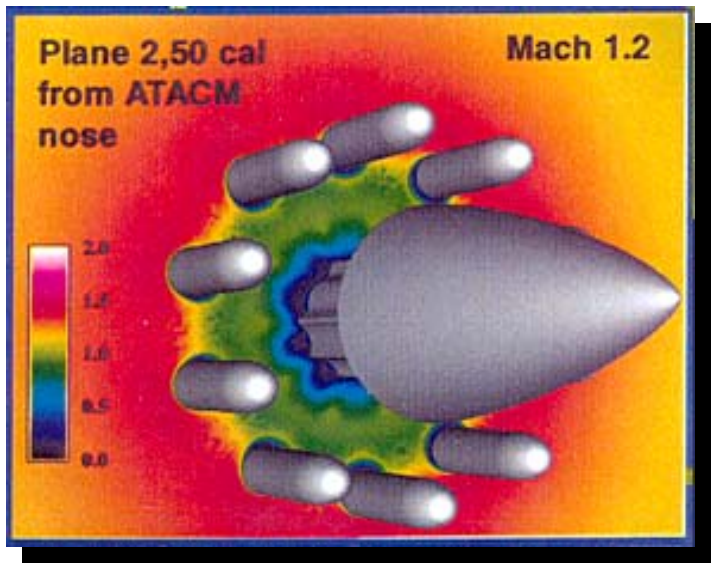
- Fragmentation radius of 15 meters.
- Effective against soft vehicle and personnel targets.
- Will not penetrate armor.

The ATACMS Missile Block II

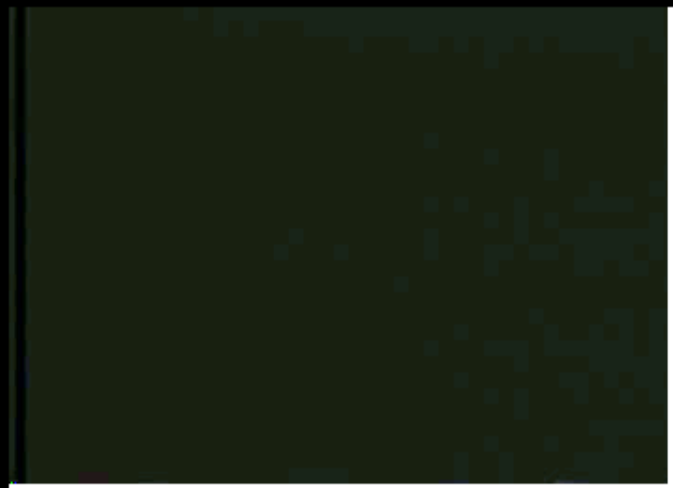


BLOCK II (FY01)

35-140km range, 13 BAT submunitions



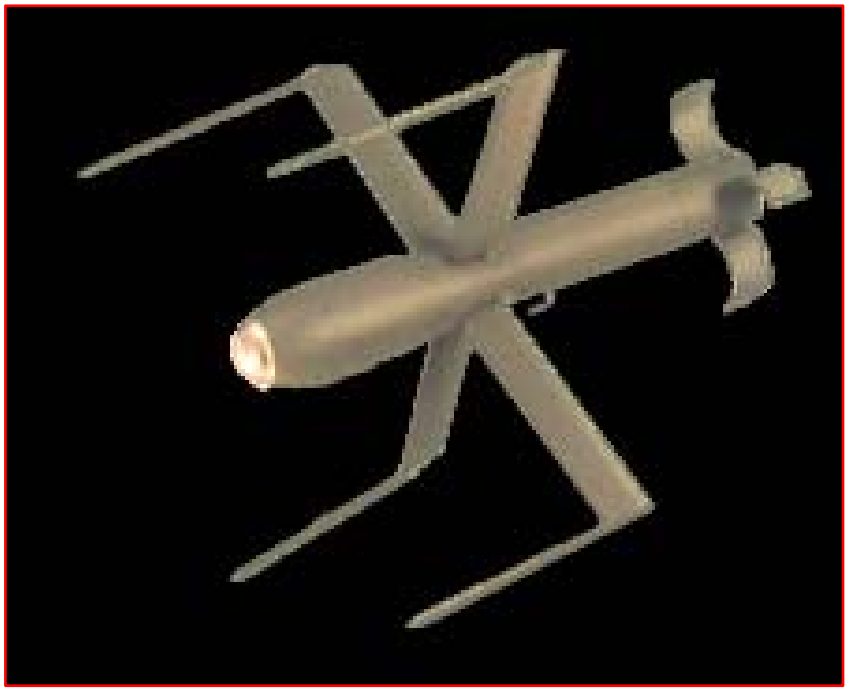
BAT Video



No Picture

BAT_MISSION.MPG

BAT



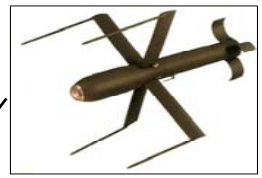
- Brilliant Anti-Armor Submunition.
- Acoustic & IR. sensor.
- Autonomously seeks & kills deep moving armor targets.
- ATACMS block II missile in limited production

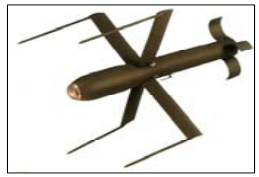
BAT Attack Profile

Each BAT Divides the Target into 26 Sectors

Direct Attack

7 BATS

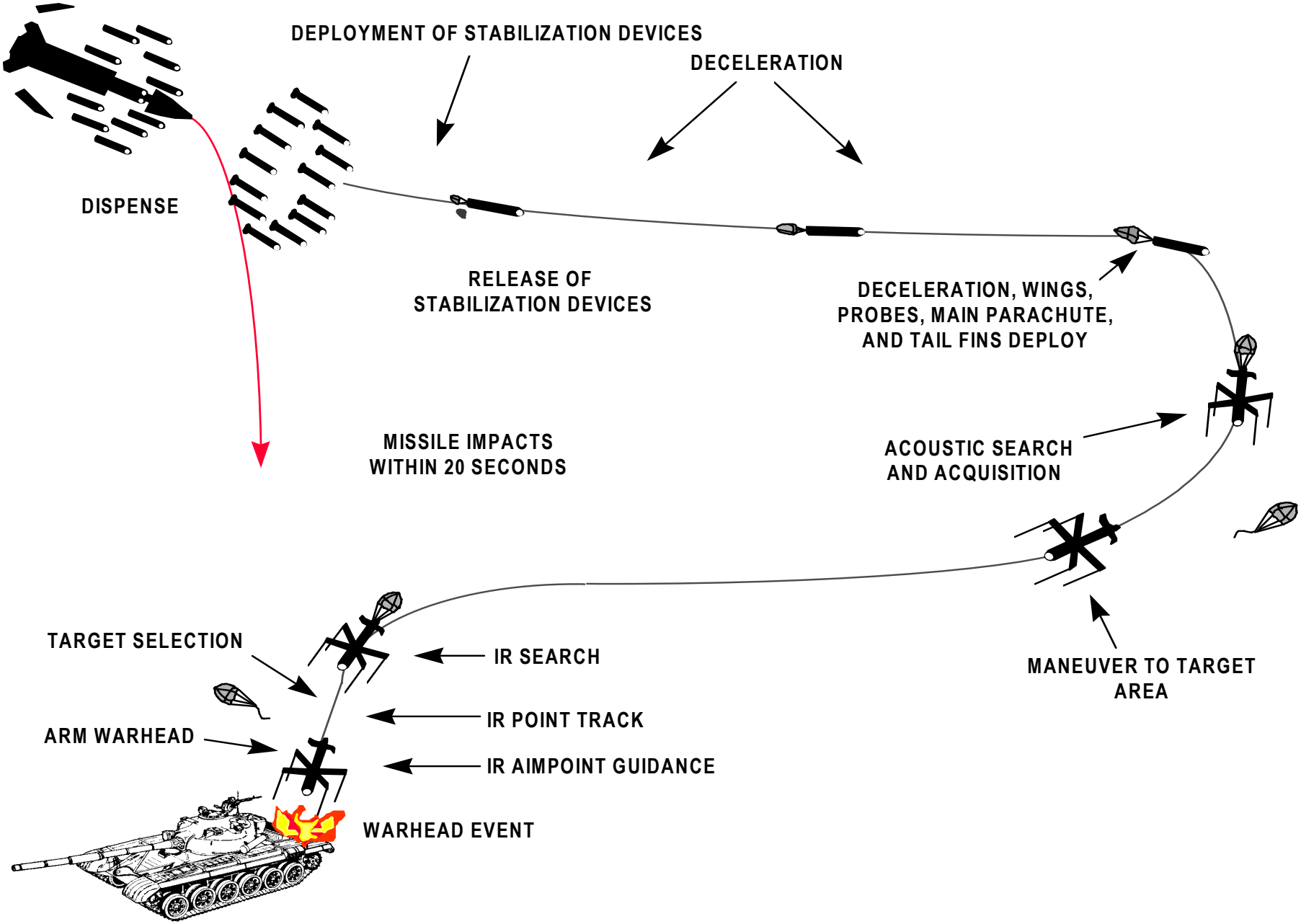




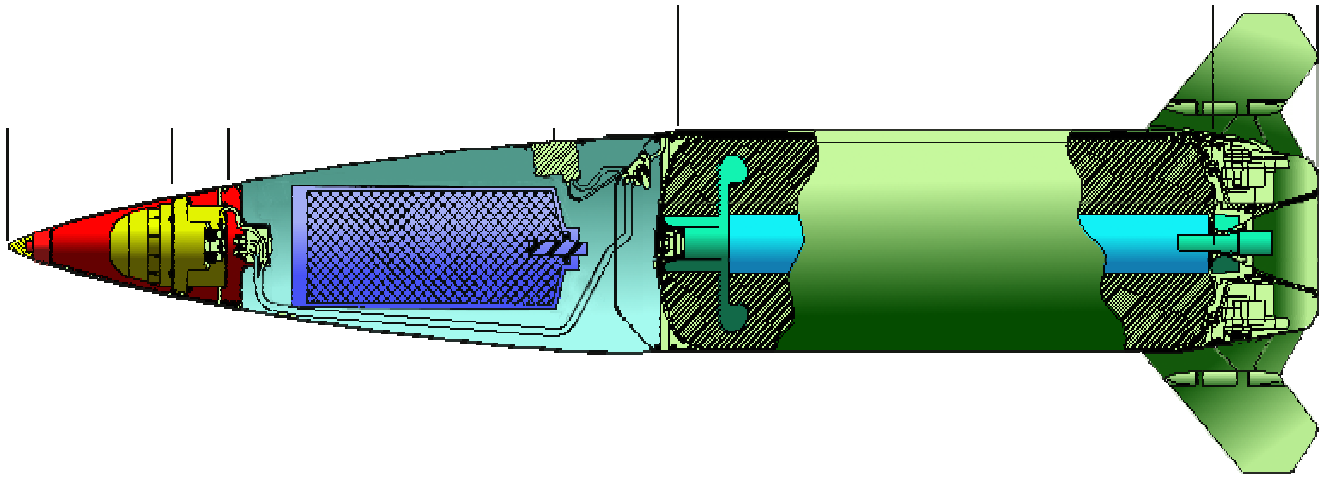
Flyout

6 BATS

Each BAT has a Pre-Programmed Target Sector to Attack

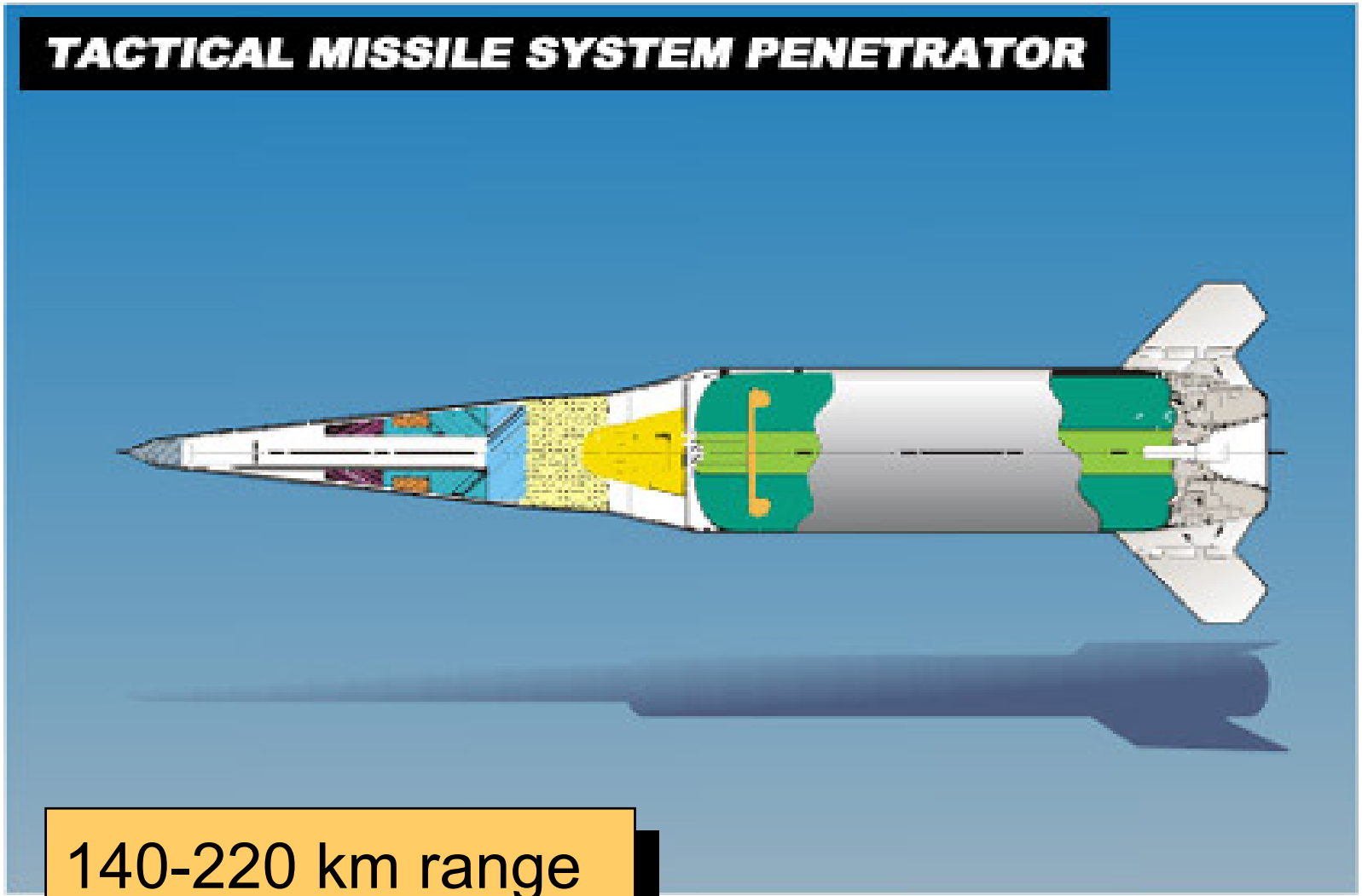

DEPLOYMENT OF STABILIZATION DEVICES
DECELERATION
DISPENSE
RELEASE OF
STABILIZATION DEVICES
DECELERATION, WINGS,
PROBES, MAIN PARACHUTE,
AND TAIL FINS DEPLOY
MISSILE IMPACTS
WITHIN 20 SECONDS
ACOUSTIC SEARCH
AND ACQUISITION
TARGET SELECTION
IR SEARCH
IR POINT TRACK
ARM WARHEAD
IR AIMPOINT GUIDANCE
WARHEAD EVENT
MANEUVER TO TARGET
AREA

Quick Reaction Unitary

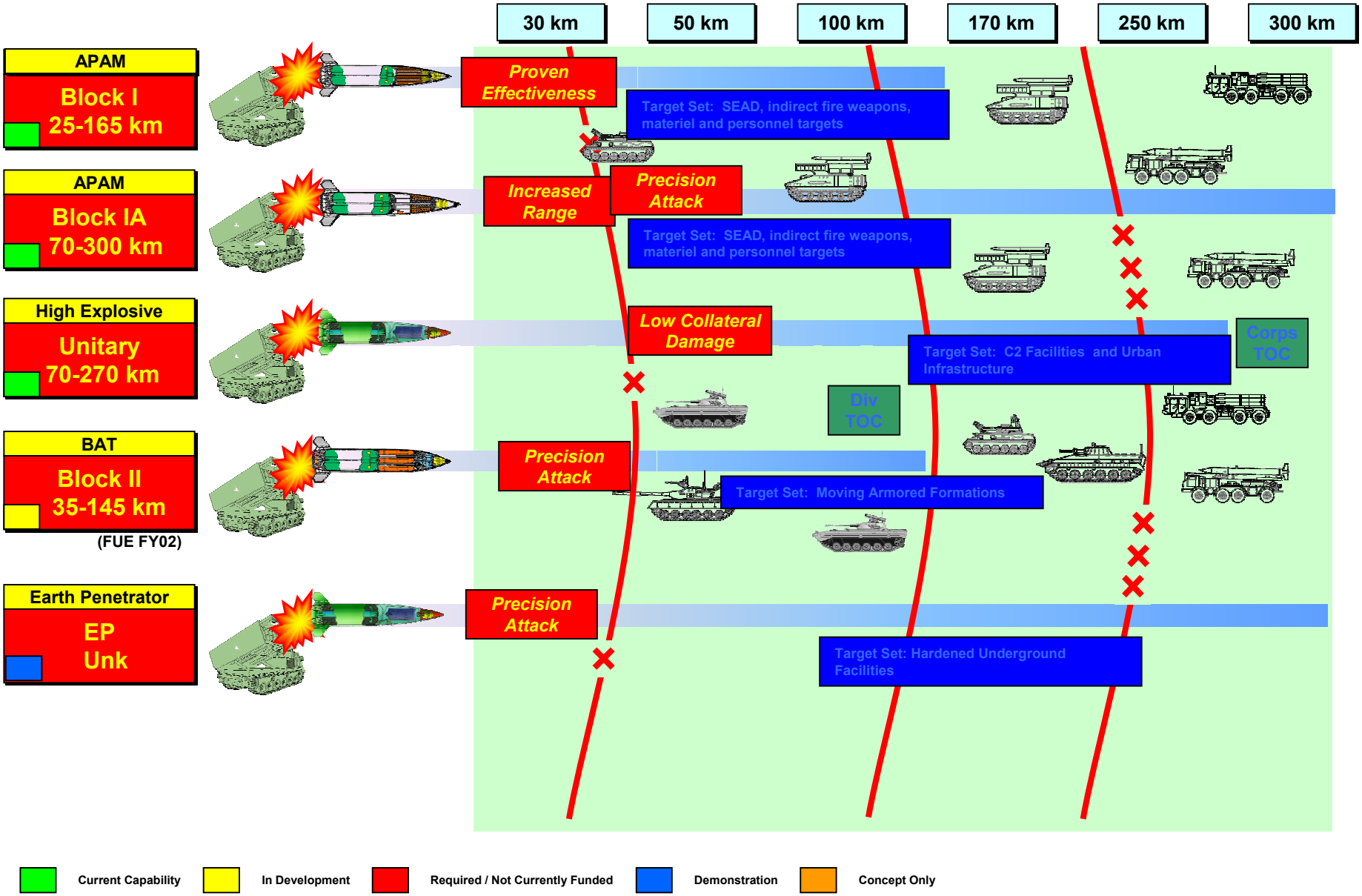


Quick Reaction Program TACMS Unitary:

- **Objective Target Sets: Includes buildings, POL sites, power plants, and other targets where collateral damage is unacceptable**
- **Integrate 500 lb WDU 18/B Warhead on 43 Block IA's**
- **Max Range 280 km**
- **Full AFATDS Integration**


TACTICAL MISSILE SYSTEM PENETRATOR
140-220 km range

AFOM Review


30 km
50 km
100 km
170 km
250 km
300 km
APAM
Block I
25-165 km
APAM
Block IA
70-300 km
High Explosive
Unitary
70-270 km
BAT
Block II
35-145 km
(FUE FY02)
Earth Penetrator
EP
Unk
Proven Effectiveness
Target Set: SEAD, indirect fire weapons, materiel and personnel targets
Increased Range
Precision Attack
Target Set: SEAD, indirect fire weapons, materiel and personnel targets
Low Collateral Damage
Target Set: C2 Facilities and Urban Infrastructure
Corps TOC
Div TOC
Precision Attack
Target Set: Moving Armored Formations
Precision Attack
Target Set: Hardened Underground Facilities
Current Capability
In Development
Required / Not Currently Funded
Demonstration
Concept Only

CAPABILITIES AND LIMITATIONS

Capabilities

- Each launcher can engage a large target area
- Complements cannon with extended range and volume of fire
- Can engage up to 6 aim points per target
- Can have up to 3 active fire missions at a time
- Excellent counter battery weapon

Limitations

- Requires a large operational area
- Long reload times (20 minutes under extreme conditions)
- Has a large danger close distance (2000M)
- Can shoot faster than resupply
- Effects are reduced when firing into areas with overhead cover
- Limited types of ammunition
- Not useful when high degrees of accuracy are required
- Limited Crew Serve Weapons

MLRS SPECIAL TACTICS

Cross-FLOT Raid

- MLRS maneuver forward of the FLOT
- Allows MLRS units to strike deeper
- Extremely effective method to disrupt the enemy's C^2 and artillery operations
- MLRS units are in high risk of enemy contact and enemy counter battery fires
- Maneuver forces needed to increase MLRS survival

Sensor-to-Shooter

- Fire mission processing times reduced drastically
- Target transmitted directly from sensor to the BOC
- Very effective against counter battery fires and fleeting targets (SCUDS)
- Increases planning for MLRS unit and radar

Stay Hot, Shoot Fast

- Launchers lay on target in general direction of target for extended time
- Battery receives refined target location
- BOC sends launcher amended mission
- Response time is measured in seconds
- Leadership is concerned with launcher survivability on firing point

Summary

- Location and Organization of MLRS Battalions
- MLRS Weapon System Components
- MLRS Family of Munitions
- ATACMS Family of Munitions
- Capabilities and Limitations
- Special Tactics

Gunnery Department

MLRS Division

"Standards Start Here"